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WORLD CROPS

Vol. 8, No. 1

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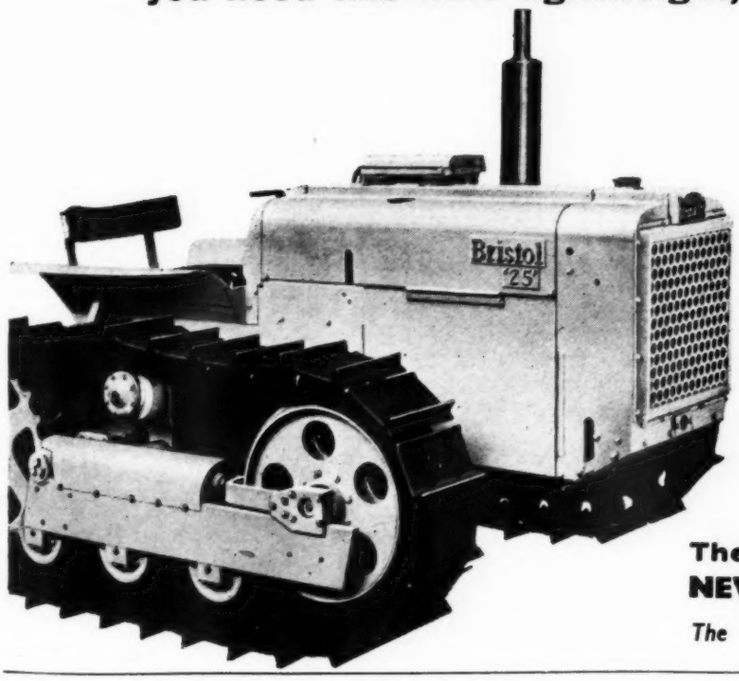

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Editorial Comment

Rhône Valley Scheme

AN information bulletin published by the committee of the Foire de Paris reached us recently. It gives details of progress made in the Rhône Valley Scheme. It says that, while France may often appear unstable and uncertain politically, the Rhône Valley Scheme, destined in all likelihood to change the face of Europe in the next quarter of a century, goes steadily forward.

The entering into service of the Châteauneuf-du-Rhône power station is foreseen for the beginning of 1958; it will work in conjunction with that at Donzère-Mondragon, of which it is in a way a part.

The scheme is financed by Government and private enterprises and it has three primary aims. The first is a series of 20 barrages to supply hydro-electric power that will make France entirely independent of imported fuel and power. The second is to make the Rhône navigable for the whole of its length, *i.e.* almost up to Lake Geneva. The third is to provide means of irrigating vast stretches of Southern France, at present suffering from lack of water, and to turn almost all barren tracts into one of the greatest vegetable-growing regions of Europe.

All the enterprises taking part in the scheme exhibit at the Foire de Paris each year in the public works section, one of the largest sections in the annual Paris Trade Fair.

Japan's record rice crop

POSSIBLE economic and political effects of the all-time record rice crop in Japan in 1955 are suggested in a recent article in the *Financial Times*. The total rice crop is estimated by the Japanese Ministry of Agriculture and Forestry to amount to 76.6 million koku (1 koku is equal to approximately 5 bushels), nearly 6 million koku more than the previous record crop of 1933. The main reason for the record crop was the increase in yield per acre caused by the excellent weather conditions throughout the summer and early autumn.

According to the newspaper article, Japanese economists believe that the bumper rice crop, coupled with good export business, will permit an economic expansion after the two-year old ' deflation '. The rice crop and the price of rice have been the main criteria of Japan's standard of living for many years. Indeed, rice is still by far the most important staple food in the Japanese diet, in spite of the spread of bread eating since the end of the second world war.

This year the Japanese Government has replaced the former system of compulsory collection of rice from the farmers on a quota basis by a new arrangement whereby the farmers sell rice to the Government voluntarily in accordance with advance commitments. A group of Japanese industrialists and Government agencies is pressing for the introduction of a price-support system to replace all official controls over rice collection and distribution. It is expected that this will reduce the living cost and, consequently, the wages of Japanese industrial workers.

The improved rice position will, it is believed by political observers in Japan, tend to lengthen the life of the Hatogama Government.

In spite of the record crop, the Japanese Government is increasing imports of rice in order to build up a stockpile which may be needed if the price-support system is introduced. It is estimated that rice imports during the current financial year ending in March 1956 will total about 1.4 million tons, as against 1.2 million tons in the last financial year.

'Atoms for seed'

IN a recent article in the British scientific magazine, *Discovery* (1955, p. 467), Dr. G. D. H. Bell conjectured on the possibility of obtaining improved seed varieties by effecting genetic changes through irradiation. Sports or mutation can thus be artificially induced and what is virtually a single-action operation offers great theoretical advantages over the lengthy approach of hybridisation and selection. Irradiation of seed by *X*-rays or by fast or slow neutrons can bring about changes in nature. It could well be that small but important improvements in varieties already introduced by traditional breeding methods may be achieved in this way. The Proctor variety of barley has been irradiated to produce earlier maturing and shorter straw forms, and British work is already sufficiently advanced for small-scale field trials of these artificially changed barleys to have started.

Whether irradiation of seed alone will produce new forms for direct employment in farming remains to be seen; the contribution of irradiation might be much less direct, with the induced mutant seed being used in further hybridisation work. The subject is still too close to its period of infancy. It may never produce a new variety of farming importance. On the other hand, it needs only a single success of this kind to spark off a technical revolution in plant varietal research.

One economic aspect of this ' peaceful use of the atom ' is certainly worth comment. A small amount of irradiation could lead to enormous benefit. It is totally different from using irradiation to preserve food or destroy plant pests; in those cases each operation calls

for irradiation. Effecting changes in genetic properties of seed involves only an initial use of irradiation; further supplies of the artificially-changed seed will presumably be producible by normal growth. An irradiation-induced varietal change that raised the yield of barley by, say, ½ cwt. per acre would bring profound quantitative results over a number of years, yet the amount of atomic-fission material needed for it could be minute.

Research in this field is being conducted in Britain, in Sweden and in the U.S.A., but in a list of papers on the peaceful uses of atomic energy read at a 1955 Moscow session of the U.S.S.R. Academy of Sciences the subject was not specifically mentioned.

If music be the food . . .

SO begins the quotation from Shakespeare's 'Twelfth Night'. Whether it has any bearing on the following report, which we noticed in *Selezione Agricola*, we leave to our readers to decide.

At the International Botanical Congress held recently in Paris two Indian students disclosed the results of a curious experiment. Certain shrubs of the *Mimosa pudica* type were subjected every evening to a 25-minute rendition of an Indian tune played on the violin. Other plants of the same species, which, while receiving a similar treatment in all other respects, but without being subjected to the nightly concert, were used as controls.

Results showed that the musically reared plants produced more abundant foliage, the number of leaves and thorns increased with 'a more rapid rhythm', and the increase in length of the branches was greater by more than 50%.

The two students observed the same phenomenon with other plants also and with different instruments, such as the flute or the simple tuning fork; the most effective instrument is still, however, the violin.

If this cultural technique should be developed, the old country proverbs might gradually be supplanted by the verses, duly adapted, of the popular Italian song, '*Compare suona . . .*'.

Wheat agreement soon?

MR. MICHAEL L. HOFFMAN reported on the UN wheat conference in the *New York Times* recently. He said that exporters and importers agreed after the first reading that the odds in favour of a new world agreement to stabilise wheat prices were better than ever.

The U.S. delegation was disappointed that so many importing countries tried to import loophole clauses that obviously cannot be included in any agreement to which the major exporting countries adhere. Because of the present wheat surplus the discussions have taken place in an atmosphere of a buyers' market and the importers have been free with their demands. The most important accomplishment of the session has been the demonstration that there is no feasible alternative to the type of agreement now in force.

Mr. Hoffman states that this pact provides, broadly, for exporting countries to commit themselves annually to deliver certain minimum quantities of wheat at not more than an agreed maximum price and for importing countries to commit themselves to buy certain minimum quantities from exporters adhering to the agreement at not less than a certain minimum price. When prices are between the maximum and minimum, international wheat trade is allowed to follow the impulses of the market. He continues that so far importers have never been obliged to meet their commitments, but exporters have had to do so on several occasions.

After consultation with their respective governments the delegates will reassemble in February; they will then tackle the problem of prices. With wheat in stock equal to more than three times the amount normally entering the world trade each year it is already clear that the importers will insist on a minimum lower than the present $1.55 per bushel.

The first meeting has also demonstrated that the agreement will have to be altered somewhat to fit a situation in which most importing countries leave the wheat trade in private hands.

'Do it yourself'

UNCERTAINTY as well as necessity is today the mother of invention—or so it seems as far as agricultural commodities are concerned. Unsettled political conditions in the countries of the Far East, which traditionally produce most of the world's pepper, have induced the U.S.A. to establish black pepper as a Western Hemisphere crop. Pilot commercial-scale plots are already growing pepper in Puerto Rico and other places in the Caribbean and in adjacent mainland areas. Botanical research workers of the U.S. Department of Agriculture have developed new propagation methods. It is perhaps too early to pronounce a reliable verdict, but it seems reasonably likely that a commercial pepper-growing industry will come into existence. Not dissimilar in pattern is the current effort of American research to develop kenaf as a substitute for jute fibre. For several years now this effort has been fighting against harvesting and processing difficulties; indeed, in 1952, the position was regarded so dismally that official price-support incentive was withdrawn from the crop. Now, however, technological prospects for turning acres of kenaf into miles of useable fibre seem a good deal more promising. Better means for mechanical harvesting are in sight and a successful chemical process for retting has already

been developed (*Notes on Science in U.S.A.*, Brit. Comm. Sci. Office, 1955, H.M.S.O.). In a few years kenaf grown in the U.S.A. and in neighbouring South America may be competing with imports of Asian jute. Again the main motive behind this development is the U.S. fear of relying for an important raw material upon parts of the world where industry may be directly or indirectly affected by political unrest.

The supreme example is already historical—the discovery and development of America's potash industry. This was entirely stimulated by the effect of the first world war upon supplies of potash from Germany. Natural potash sources were diligently looked for until they were indeed found. But each development of this kind increases America's degree of self-sufficiency, already high enough by natural endowment. The effect upon world trade cannot but be adverse. It is not price or exchange worries that encourage the U.S.A. in these 'do-it-yourself' projects; it is long-term uncertainty of supplies by import.

'High' yields

IN a recent issue of the British Ministry of Agriculture's journal (*Agriculture*, 1955, **62,** 262) an article discussed grassland productivity on farms in the Pennines at altitudes of 800 and 900 ft. above sea-level. One of the conclusions drawn was that early fertilising seldom brought a response before the end of April—for this to happen there has to be an exceptionally mild spring. At these heights extension of the grazing season by grassland management can only be rated as 'slight' at best. In sharp contrast, U.S. Department of Agriculture research has been directed towards meadow grassland at mountain heights. In 11 states it is estimated that there are 3½ million acres of meadowland at between 6,000 and 9,000 ft. above sea-level, little used in the past for reasons of inaccessibility, but capable of producing good hay and forage crops.

Development tests have been carried out in Colorado. Dramatic responses were secured by using fertiliser nitrogen. Applying 100 lb. of nitrogen in the early spring, and repeating this in midsummer, led to yields of hay of 4 tons per acre; without fertiliser yields were only 2.4 tons of hay. Converted into beef-cattle feeding results, weight gains of 606 lb. per acre came from the fertilised grass and only 321 lb. from the unfertilised grass. (It was said that phosphatic fertiliser had little effect, but this could well be due to the natural phosphate reserve of long-neglected land.) Other tests showed that $25 spent upon nitrogen fertiliser produced an extra output of crude protein worth $40, though it should be added here that some irrigation was also needed to achieve efficient nutrient utilisation.

Climate rather than altitude clearly determines the potential productivity of high land. When a few hundred feet delay the coming of spring by a few weeks an economic response from normal methods of grass management is something of a gamble. On the other hand, the American approach towards utilising the potential of grass several thousands of feet in altitude seems to have concentrated upon taking two cuts of hay per growing season. This is a reversal of the familiar British system, which uses low-lying land for cold-season grazing and summer hay-making and puts grazing cattle on the high lands for their summer feeding. But cattle are mobile and hay is not; the costs of transporting the hay from high-level grassland would probably make this system less attractive in Britain.

West Indian development

THE report for 1954 of the Comptroller for Development and Welfare in the West Indies, published recently (Colonial No. 320, H.M.S.O., 1955, 5s.), brings together the main strands of economic and social achievement with particular emphasis on their significance to the area as a whole. The following information is taken from the report and shows the economic developments in the individual territories noted in the report.

British Guiana.—A reconnaissance soil survey was carried out and a site chosen for a central agricultural station to be built with financial assistance from C.D.W. (Colonial Development and Welfare) funds. A new livestock station was established and two others expanded. The new station will provide for experiment and research in grassland and livestock management and in cattle breeding in the Rupununi savannahs. During the year a separate Land Settlement Department was set up and two existing settlement schemes were extended, one with a C.D.W. grant of £23,500. A similar sum was made available to purchase additional machinery for hire to settlers.

A C.D.W. grant of £15,300 was approved for timber appraisals to form a basis for the extension of logging operations, and a scheme, financed from local funds, was started to implement the International Bank Mission's recommendation for the provision of credit to lumber enterprises.

The special two-year development programme for British Guiana financed largely from C.D.W. funds will allow the carrying out of many improvement schemes to be accelerated.

St. Lucia.—Good progress has been made in agriculture in St. Lucia. The development of the banana industry has gone ahead, and progress has also been made with the formation of a Sugar Cane Farmers' Association. New development schemes relating 'to livestock, cocoa and staff requirements' and some minor schemes have been granted nearly £130,000 from C.D.W. funds. A block grant of £20,000 for build-

ing feeder roads has also been approved. Special assistance has been promised, of £350,000, for road and agricultural schemes in the island.

Leeward Islands.—Attention was focused on potentialities for livestock development. A compulsory dipping campaign was carried out in the Virgin Islands. Livestock improvement schemes were carried out in Montserrat, Antigua and Barbuda. A Director of Agriculture was appointed in Antigua, with a grant from C.D.W. funds.

Jamaica.—A £125,000 (50%) C.D.W. grant was made towards the resiting of the School of Agriculture, a move recommended by the International Bank Mission.

Other Territories.—Specialist officers have been employed to develop the cultivation of rice and tobacco in British Honduras and three new forestry schemes were approved for C.D.W. grants during the year. In Grenada a further grant of £16,600 was made to provide assistance to small-scale farmers to cover the period from the beginning of 1954 to March 1956. Banana and sugar cultivation is also being aided. In St. Vincent a report on a plan for, and possible costs of, a land-use demonstration project was under study. Government banana nurseries were set up, using C.D.W. funds, and the foundations thus laid for a banana industry in the island. A growers' association was formed. A proposal to establish a fisheries school in the Windward Islands is under consideration.

The opening of the Eastern Caribbean Farm Institute, which took place early in 1954, should represent an outstandingly important development. The Institute fills a need for the provision of training, at a level between that of university institutions and secondary schools, for agricultural students, many of whom may become members of the agricultural extension services.

Another regional project that would be of assistance to agriculture was the proposed creation of a regional research centre at the Imperial College of Tropical Agriculture in Trinidad, approved by the governing body of the College late in 1954, and requiring the approval of the Secretary of State for the Colonies. It would entail the amalgamation of present schemes for research on cocoa and bananas and for soil surveys.

Western Germany

THERE is a concise and valuable account of Western Germany's farming problems in a new D.S.I.R. publication, 'Science and Technology in Western Germany' (H.M.S.O., 1955, 4s.). The East/West division of Germany is also a population/cropland division, for the Eastern areas used to produce a surplus of food which the industrialised Western areas consumed. Before the Hitler war Germany as a whole had 100 acres of arable land per 100 inhabitants, a closely similar ratio to that of Britain. Now in Western Germany the ratio is 42 acres per 100 people, and the situation has been aggravated by the flow of refugees or expelled persons from East to West. Since 1945 Western Germany's production of food has been raised by nearly one-fifth, but it is still inadequate. The drift of labour from farms to factories is a serious impediment. Equally difficult is the small-farm pattern of Western Germany; only Italy has as many small farms. Huge efforts have been made to introduce mechanisation through the community owning of farm machines and in five years the number of tractors on West German farms rose from under 100,000 to 330,000.

Agricultural research seems not to have as many centres as Britain, but it is energetically supported. Fundamental subjects occupy the foreground to a rather greater extent—perhaps apparently more than actually—than in Britain. Humus and organic matter aspects of fertility are being given rather more attention than inorganic nutrients. This may well reflect the German predominance of light soils. The relationships between plant growth and moisture are also being vigorously investigated. These are the old themes of 19th-century agricultural science; and there may be much to be said for returning to them with the research weapons of the mid-20th century. Broadly, it may be said that German agricultural research has acquired a markedly biological bias.

Protein from plant

EXPERIMENTS reported at the recent University of Arizona symposium on solar energy revealed that a single-celled plant, using solar energy for growth, has been found to produce proteins equal to the best animal protein of milk and eggs. The protein from the plant, which is a member of a species of fresh-water algae named *Scedenesmus obliquus*, was described as far surpassing the protein substance of other micro-organisms like yeasts and fungi, and also of seeds of higher plants, like soya beans and peas.

Reporting the studies, Dr. Hermann Fink, of the Institute for the Study of Fermentation and Enzyme Chemistry at the University of Cologne, Germany, said that experiments carried out so far only on albino rats showed that nearly half the substance of the plant's cell consisted of protein equal in nutritive quality to that of milk and eggs, the protein foods possessing the highest nutritional values.

Proteins are urgently required in many parts of the world where protein foods are rare or unavailable. It is possible that the protein from the plant, which needs only water, sunlight and a few common minerals for growth, may be found to have the same high nutritional value in human diet or cattle feed. If this is so, the plant may well become a major factor in increasing the supply of the world's most valuable food element.

WORLD AGRICULTURAL PRODUCTION, 1954–55
AND OUTLOOK FOR THE IMMEDIATE FUTURE

In accordance with established custom we give below a summary of the principal features of the world agricultural situation during 1954–55, together with the outlook for the immediate future. This survey is, as usual, based on reviews published by FAO. We would refer our readers to these publications for a more comprehensive survey.*

THE world economic situation in the 1954–55 crop year has been characterised by the rapid recovery of the U.S.A. from the 1953–54 recession, by the continuation of high levels of economic activities in Western Europe with the appearance, however, of some stresses and strains; by the steady though slow rise in the economies of non-Communist Asia; by the renewal of inflationary pressures in large parts of Latin America; and by continued difficulties in the agricultural sectors of China, the U.S.S.R. and Eastern Europe. In spite of the generally favourable economic conditions in most parts of the world and the subsequent high demand for agricultural products, some of the more basic difficulties in the field of foreign trade and international payments still persist, agricultural prices are generally sagging compared to industrial prices, and the problem of agricultural surpluses continues.

Short-Term Outlook by Region

The official statements on the economic outlook for 1955–56 in the highly industrialised countries of the world are, on the whole, optimistic and there were no signs of a slackening in the boom conditions in the U.S.A. or in Western Europe, or of changes for the worse elsewhere. However, some of the indications mentioned above point to the possibility of a slow-down of the rate of expansion in the second half of 1955; its repercussions might lead to a levelling off of economic activities in 1955–56 or even to a slight recession in particularly vulnerable areas.

U.S.A.

Domestic demand for agricultural products, which is little affected by small changes in overall economic activities, is likely to remain strong and agricultural exports are expected to, at least, maintain the gains achieved in the first quarter of 1955 based on the continuance of special Government disposal programmes, favourable economic conditions abroad, and less pressure from the scarcity of dollars. Yet, in view of existing large excess supplies, which are expected to increase even more in 1955–56, of lower support levels, of continued acreage restriction and prospective reduced output, and of only slightly reduced production cost, net income of farmers in 1955 was forecast at 5% below that of 1954, a reduction which is likely to continue through the full crop year

Rice is the basic food of more than half the world's people. A special activity of FAO is the rice hybridisation project being carried out in co-operation with the Indian and other Asian governments at Cuttack in India. The photograph illustrates rice production in Thailand

* Monthly Bulletin of Agricultural Economics and Statistics, 1955, 4, No. 8: "The State of Food and Agriculture, 1955", 1955 (Rome: FAO).

TABLE 1
INDEX NUMBERS OF FOOD AND TOTAL AGRICULTURAL PRODUCTION
(Prewar average = 100)

Region	1946–47	1947–48	1948–49	1949–50	1950–51	1951–52	1952–53	1953–54	1954–55
FOOD PRODUCTION									
Western Europe	76	85	94	104	110	115	115	122	124
North America	138	135	142	134	139	139	152	151	145
Latin America	115	120	121	122	130	125	135	136	139
Oceania	92	108	109	116	111	104	117	120	116
Far East (excl. China)	91	93	97	100	100	102	105	110	109
Near East	103	102	114	112	120	126	135	144	138
Africa	107	111	117	124	128	130	137	142	142
All above regions	103	106	112	114	118	120	126	130	129
WORLD*	93	97	104	107	111	112	117	120	120
TOTAL AGRICULTURAL PRODUCTION									
Western Europe	77	85	95	104	110	115	115	122	124
North America	134	129	139	133	133	137	148	148	141
Latin America	111	114	116	119	125	121	131	132	135
Oceania	95	107	110	117	112	107	121	122	120
Far East (excl. China)	88	92	96	99	100	103	106	109	109
Near East	102	101	113	112	121	126	135	143	138
Africa	108	112	118	125	130	133	140	144	145
All above regions	101	104	111	113	116	119	125	128	127
WORLD*	92	96	103	106	110	112	117	120	120

* Including estimates for the U.S.S.R., Eastern Europe and China.

1955–56. Unless a much sharper down-turn than now seems possible occurs in 1955–56, U.S. imports are likely to continue to rise and may be larger than at any time since the war.

Canada

Canada expected 1955 to be the most prosperous year in its history. The improvement was to come from a much better wheat harvest, from rising private and public investments (except in agriculture, where such expenditure was expected to remain at the much reduced level of 1954), and from the end of inventory liquidation. In addition to a 12–13% personal income tax reduction for 85% of Canadian taxpayers, consumer expenditure is also likely to increase because of expected higher employment and income. It is hoped that wheat exports will reach the 1954 figure and other exports should benefit from the high economic activity in the U.S.A. and Western Europe. Domestic demand should thus remain high.

Western Europe

In Western Europe, the United Kingdom expects some increase in fixed investment in the basic industries, in non-industrial buildings, in Government expenditure and in consumers' purchases. Exports are hoped to be greater and thus total demand is likely to keep on expanding, making it almost certain that full employment will be maintained. However, since unemployed resources, particularly of manpower, are already scarce, there is a possibility that this growing demand might engender inflationary pressures which in turn would affect unfavourably the competitive position of the United Kingdom in world markets and reduce export possibilities already threatened by import restrictions in important markets. The British Government has stated on numerous occasions that it will take whatever measures may be necessary to ensure that its policy of encouraging higher production, while, at the same time, keeping consumption and stock-building through the monetary mechanism within bounds, will continue. Yet there have been income and sales tax reductions in the spring of 1955 which have had the opposite effect. Continuing wage and price rises, of which the recent increase in the price of coal is just one example, could worsen the balance-of-payments position of the United Kingdom and could necessitate restricting imports of the semi-luxury type, if not of basic, foodstuffs. Although the likely sustained high domestic demand would require increased imports of agricultural raw materials, any failure of the drive to expand exports of textiles and automobiles, for example, may reduce import requirements, particularly of fibres and rubber.

Pushing against the limit of employable economic resources may similarly slow down expansion in some other European countries. The Central Planning Bureau of the Netherlands expected a rise of about 2% of the gross national product in 1955, against more than 6% in 1954. A reduced rate of expansion is anticipated for sales of industrial products, for power and for investments. Gross investments in agriculture are estimated to be 20% lower. It is expected that higher wages and continuing full employment will maintain the high domestic demand for agricultural products and also that exports will rise slightly. The national budget of Norway for 1955 foresaw a dampening of the strong expansive forces as well as a reduced balance-of-payments deficit. Neither unemployment nor inflation are feared, however. With the expected small rise of consumers' expenditure, demand for agricultural products is likely to remain little changed. However, developments in the second quarter of 1955 indicate, on the one hand, a continuing vigorous expansion; on the other, a sharp worsening of the foreign exchange position. Similarly, the revised national budget of Sweden anticipated a 6% increase in private consumption in 1955, domestic demand for agricultural products to remain high, food imports to be slightly greater and agricultural exports to be about 10% lower. Recent inflationary

developments, however, led to measures intended to reduce investment and the expectations may thus turn out to be too optimistic. The measures adopted in Denmark for curtailing private consumption will affect imported agricultural products, such as coffee and tea and textiles. Yet, on the whole, domestic demand will still be substantial, unless more stringent measures should become necessary. There are at present no signs that further economic expansion in Western Germany will face any difficulties owing to lack of internal demand. Exports are likely to continue at a high level. Although Western Germany has not yet reached the stage of maximum employment characteristic of the Western European countries discussed above, some scarcity of skilled manpower and of agricultural workers, widespread requests for substantial wage increases and some bottlenecks in raw material supplies are the first indications that Germany also may join the group of European countries whose major problem in 1955–56 will be how to maintain full employment, and at the same time to continue expanding output without producing inflation.

The prospects for the French economy are evaluated somewhat variously by different official sources. The *Commissariat du Plan* anticipates a further 10% expansion of production by the end of 1955–56 without any increase in prices, whereas the *Inspecteurs de l'Economie nationale* point to some factors that might check further rapid expansion. The latter expect some cut-back in the construction of private homes and a levelling off of the output of consumers' non-durable products, especially textiles. The discrepancy between the development in the heavy and light industries, the backwardness of certain agricultural areas, the preponderance of raw materials—agricultural and others—in exports, all account for sharp regional disparities. The concentration of economic expansion in the 'rich' areas of France could have repercussions on the general demand for agricultural products; the demand partly depends also on the export prospects for French agricultural products, which are not very favourable for some commodities (wine).

Natives picking up and stacking sheaves of wheat near Pont de l'Isser, Oran, Algeria

Economic activity

To summarise, it may be said that Western Europe is likely to remain in 1955–56 on a high level of economic activity, although the rate of expansion will be—perhaps very much—lower than in 1954–55. Domestic demand for agricultural products will be sustained, but any deterioration in the balance of payments would affect unfavourably imports of certain non-basic agricultural commodities (coffee, tobacco etc.).

U.S.S.R.

Since the demand for foodstuffs and agricultural raw materials in the U.S.S.R. and the other countries of the Soviet *bloc* is affected by political decision rather than by the interplay of economic factors, there is little possibility for even speculating on their future developments. The spectacular change in overall policy towards a return to relegating to the background satisfaction of consumers' demand may, however, not necessarily mean that the U.S.S.R. will not occasionally reappear as a buyer of foodstuffs in the world market. On the other hand, difficulties in the agricultural sector make it unlikely that the U.S.S.R. and/or some Eastern European countries will add substantially to supplies available to importing countries.

Oceania

The economic outlook for Australia and New Zealand is closely connected with the marketing prospects for their main agricultural export commodities. Mainly as a result of the fall in wool prices, returns from agricultural exports are expected to decline by 10% in 1955–56, although the long-term outlook remains sound. Wheat exports from Australia are likely to remain under the pressure of existing huge inventories in other wheat-exporting countries.

Asia

Only for a very few countries in the other regions of the world are there

either indicators of, or official or semi-official pronouncements on, the short-term outlook. Among Asian countries, the proposed 1955–56 budget of India envisages larger expenditure mainly for expanded economic development projects at the expense of a greatly increased budget deficit. No threat of inflation is feared, since food supplies from recent harvests are ample, and a further rise of domestic production is expected. However, domestic demand for foodstuffs, particularly grain, may improve as these increased investments take effect; there has been a growing surplus of wheat and it is expected that imports of rice and coarse grain will be unnecessary. The steadily expanding textile industry should secure a growing market for domestically grown fibres. The Government of Ceylon expected a fair increase in consumers' expenditure in 1955 as the result of wage increases granted in 1954, but the expansion of the gross national product will depend on price developments of the major export crops (tea, rubber, copra). Indications are that demand for and prices of tea and copra may increase in 1955–56. The budget of Pakistan for 1955–56 provides for a 40% increase of public capital expenditure to be financed by new taxes and internal and external borrowing. If these projected investments materialise and crops turn out satisfactorily, a further rise in domestic demand for foodstuffs and textiles is possible. Japan seems likely to continue its deflationary policy in 1955–56; unemployment is unlikely to recede, since, in addition to the effects of budgetary restrictions, the textile industry is undergoing a crisis of its own and special dollar receipts may decline further. Thus domestic demand for agricultural products may even decrease, though this might reduce imports rather than affect domestic producers. Except for Japan and the major rice-exporting countries, whose exports may be affected by the increasing self-sufficiency of importing countries, it is expected that improved export conditions, based on the high level of economic activities in developed countries, as well as continuing large development expenditure, will sustain or perhaps slightly increase the demand for agricultural products in the region.

Latin America

A detailed forecast for Latin America, based on country projections, is also difficult to make. The Central Bank of Argentina hopes that new foreign credits will alleviate the effects of the unfavourable export prospects for Argentina's most important products and will make it possible to avoid severe import restrictions. In spite of the market outlook, 1955 may still turn out moderately good compared with the preceding five years. Although the present situation in the coffee-consuming countries and the favourable production outlook make a recovery of exports and some improvement of prices probable, the economic outlook for Brazil is not very favourable. Inflationary pressures will probably continue and the rising cost of living is likely to prevent an expansion of domestic demand in 1955–56. Inflation is likely to continue unabated in Chile. Further domestic price rises seem inevitable, but salary and wage readjustments will permit demand for agricultural products to remain almost unaltered. The Bank of Mexico evaluates the prospective developments rather optimistically, basing its outlook on the favourable crop prospects for 1955 partly accounted for by the new agricultural credit policy, irrigation schemes and the use of better seed and fertilisers, as well as on the improved trend of production and sales since December 1954. Another factor is the improved balance-of-payments position, owing to greater exports and to the return of flight capital. Domestic demand for agricultural products is thus likely to increase and the outlook for exports of products such as coffee, cotton and coarse grains is also favourable. In Colombia, because of the drop in coffee prices, a slowing down in the rate of investment is expected in the immediate future. In Venezuela the rate of capital accumulation may not be as spectacular as it has been in the past, owing to the adverse effect on prices of oil of larger exports from the Near East. In Peru, on the other hand, high prices of metals and good export prospects may permit further expansion in 1955–56.

For the region as a whole, the outlook is rather uneven. For the countries still under the pressure of inflation and of balance-of-payments difficulties prospects are not very encouraging, but for the others some improvement is likely. The common problem remains the lack of means to finance the large development programmes. According to the Economic Commission for Latin America, capital requirements are substantially in excess of capital availability, and the trend toward a lower rate of capital investment may continue in 1955–56.

Near East and Africa

In the Near East and Africa the prospects for 1955–56 in Turkey are improved, owing to the possibility of a better grain harvest. However, since its effects on foreign trade—if any—will materialise only late in the crop year, foreign exchange difficulties are likely to persist and the trade deficit to increase again. Inflationary pressures will increase, requiring more drastic measures, *e.g.* import restrictions. Domestic demand probably will remain high, but might be somewhat affected by further increases in domestic price levels. Egypt's economic prospects depend to a great extent on cotton, for which forecasts are difficult to make. There are as yet no signs of a revival of the textile industry over the world and even if there is no acute danger from the surpluses held by the U.S. Government, surplus disposals may be having some effects. These effects on the domestic demand in Egypt are indirect (reduced imports, rising cost of living), since the Government purchases the cotton crop to support prices, but they are unlikely to reduce the relatively low level of such domestic demand to any considerable extent. In the Union of South Africa, consumers' expenditure is expected to show a normal increase consonant with the anticipated rise in production and should be stimulated by the tax reductions. Public investments will contribute to maintaining the high level of employment. Imports will increase owing to a relaxation of restrictions and are expected to prevent further domestic price rises. In other Near East and African countries domestic demand, based on vast development programmes and favourable prospects for exports of minerals and most export crops, should continue its slow upward trend.

For the world as a whole, the year

1955–56 is likely to be one of continuing economic expansion, though at a reduced pace. The generally favourable situation in the industrialised countries is reinforced by the appearance of tangible results from the development programmes in a number of less developed countries over a wide area. Some disturbances may appear later in the year, but they are unlikely to reach dimensions which would seriously affect the demand for foodstuffs, even though they might reduce the international demand for some agricultural raw materials. This demand has so far been relatively little fostered by the boom conditions in the U.S.A. and Western Europe, but it may be too early to ascertain whether there is a long-term trend of a further diminishing correlation between the economic activity in industrialised areas and the export volume and prices of agricultural raw materials, and their repercussions on the economy of raw-material-exporting countries. At the same time, another good crop is probable in most of the major producing areas, and—in spite of acreage restrictions in the U.S.A.—it will probably at least cover current demand. Thus the pressure of excess supplies carried over from previous crop years will remain. In the short run, the sustained demand is not likely to stop the downward trend of agricultural prices and it appears, generally, that no substantial improvement of farmers' net income is to be expected.

An example of cotton grown on the large Hopson plantation near Clarkdale in the U.S. cotton-growing state of Mississippi. It was harvested entirely by machine

Short-Term Outlook by Commodity

Wheat

The large carry-over of wheat in exporting countries will continue to overshadow wheat markets in the current year. Production restrictions in the U.S.A., combined with unfavourable weather in Canada in 1954, checked the increase in stocks in 1954–55, and continued area restrictions in the U.S.A. may succeed in bringing about a light reduction by the end of 1955–56. Elsewhere no curtailment of production has been enforced and in many countries the rising trend in production has probably not run its full course. There is thus little prospect in the immediate future of a significant recovery in trade, and the pressure of supplies on grain markets is likely to continue. Hitherto Government stockholding and orderly marketing have prevented violent changes in the export market and these safeguards may continue and may possibly be reinforced by the International Wheat Agreement if it is renewed in 1956–57 and is extended to cover a large proportion of world trade. In addition to world weather conditions, the disposition of present surpluses in the U.S.A. and the changes that may occur in U.S. farm policy will be the main factors that will determine the future.

Rice

Supplies which could be made available for export are still ample to meet any calls importers are likely to make on them in the near future. Purchasing power generally has been well maintained, but the demand for imported rice threatened to contract recently, owing to changes in the two special circumstances which were a feature of 1954. Japan has reaped over a million tons more rice than in the previous year and India has already built up most of her intended reserve. The main sign of growth in import demand is from China and Eastern Europe, though in both cases it is not yet clear how far this will be an increase in net imports. The share of world imports supplied by Asia may be higher than in the post-war years up to 1953, but much will depend on the policy regarding Government stocks to be adopted by the U.S.A., since most of the exportable surplus of the 1954 crop in that country is now in Government hands.

Present world prices have probably diminished the prospects of any marked revival in production for export in Brazil. In some other countries, too, where there is a fair choice of alternative uses for land and labour, the expansion of the rice area is likely to be halted. Wheat prices have kept steady over the last year, so that the further decline in rice prices during this period in some retail markets has tended to make rice a more attractive purchase, and this, coupled with the widespread abolition of rationing, is almost certainly leading to some increase in rice consumption.

Sugar

In most major producing areas sugar output is likely to rise in 1955–56, notwithstanding crop restrictions in a number of important producing areas.

Of importance to the world free market will be the development of the European beet crops. Should weather

conditions produce a crop in excess of 10 million tons (as in 1953–54), European import requirements would be severely reduced. The problem of effecting a balance under the International Sugar Agreement between free-market supplies and requirements could become very difficult.

Tea

Future developments will be mainly determined by economic considerations. There is no doubt that production in the main Far Eastern countries and in Africa could be further increased through replanting with higher-yielding plant material, heavier manuring and more efficient pest control, even without expansion of area. For the current year early crop reports point toward a somewhat larger output in Ceylon and Southern India.

Cocoa

The economic outlook for cocoa is favourable—provided research on the synthetic substitutes, which has been greatly encouraged by high prices during the past few years, does not meet with substantially greater success than hitherto, and production of cocoa is increased gradually to enable manufacturing, distribution and consumption to become adjusted to an expansion of supplies. Indeed, the economic outlook for cocoa appears to be more favourable than for any other major agricultural commodity.

Tobacco

In spite of the extensive control over tobacco plantings, stocks in exporting countries have accumulated in recent years, mainly in the U.S.A., Canada, Cuba and India. In the U.S.A. area quotas for flue-cured and Burley tobacco were further reduced in 1955 to establish a balance between supply and demand and the tobacco market is expected to remain stable for 1955–56.

Cotton

Although special surplus disposals may give some relief, a further cut in production and possibly a cut in prices is in prospect. In the U.S.A. the acreage allotted to cotton for 1955–56 has again been sharply reduced, so that even with the very high yields of the last season the crop could decrease by half a million metric tons. This would more than offset any further increase likely to occur in other cotton crops and the world carry-over might begin to diminish.

However, producing countries other than the U.S.A., being able to dispose of practically all the cotton they can produce, either to expanding textile industries at relatively low local prices, or in the world markets at a shade below the U.S. support price, will continue to expand production so long as U.S. prices remain relatively high.

Coffee

Substantial stocks have been accumulated in the two chief producing countries and prospects are for further production increases. Moreover, 1955 prices are still generally very remunerative to producers and may continue to stimulate new planting. Should the experience of the three previous cycles be repeated, production might rise very substantially during the next five to seven years. Governments of some producing countries forecast great production increases in the next few years. It is possible, therefore, that the world coffee economy will again be confronted with very difficult conditions in the future, unless effective international co-operation can be developed.

Jute

The sharp fall in the price of rice last season, combined with the strengthening of jute prices, has made jute a more attractive crop. All the evidence suggests that the Pakistani target of a maximum crop of one million tons will have been exceeded in 1955, probably by a considerable margin. For similar reasons a heavy crop was also expected in India.

Rubber

The expansion in demand has continued. The International Rubber Study Group estimates total consumption for the whole year at 2,830,000 metric tons (including 1,860,000 metric tons of natural rubber), which is 11% greater than the record totals of the last two years. For the first time since the war expansion in the consumption of natural rubber will be limited by the volume of current production rather than by the competing demands of strategic stocks. Output is expected to increase, as a result of rising prices, by only 2½% to 1,875,000 metric tons, which leaves a very small balance to improve the level of commercial stocks.

The price and production policies of the now privately owned concerns in the U.S.A. will clearly have an important bearing on the future demand for natural rubber. The long-term demand for rubber in general is extremely favourable. However, the proportion satisfied by natural rubber is likely to decline unless its output can be expanded fairly quickly at prices competitive with those for synthetic rubber.

Hard fibres

At the end of the war hard-fibre production was 25% below the prewar level, mainly as a result of devastation in the Philippines (*abaca*) and Indonesia (*sisal*). The recovery in output, which in 1952 and 1953 reached a level moderately above the prewar average, was largely due to the increased production of *sisal* in Africa and Latin America. *Henequen* production fell away from early postwar high levels. *Abaca* production has recovered to only two-thirds of the prewar level, being adversely affected, among other things, by mosaic disease.

The improvement in industrial activity, however, held the promise of a revival in demand for *abaca* in 1955.

The increasing relative importance of *sisal* in hard-fibre supplies, already in evidence for the last 30 years, has been reinforced by postwar developments. Output is still rising and the indications are that the international market is likely to remain highly competitive.

Timber

World development can be expected to continue toward a greater output of wood pulp and its products, and the production of less finished forest products is likely to remain more or less stationary. In Europe and North America, where the available forest resources are already under heavy exploitation, there is little possibility of any sizable increase in the total volume of roundwood production. The demand for wood pulp is rising faster than that for sawn wood and other semi-finished products; the relative

importance of pulpwood in total fellings can therefore be reasonably expected to increase further.

Great efforts are being made to obtain better use of the available forest resources in every part of the world, notably with regard to hardwood pulping. This will in due course greatly alleviate the otherwise possible shortage of pulping raw materials in those countries that greatly depend on imported supplies of either wood pulp or pulpwood.

As to the possible progress in increasing the available roundwood supplies, it seems reasonable to expect, in regions such as Latin America and Asia, an increase in the rate of purely industrial and other forest plantations of fast-growing species like poplars and eucalypts. Plantations for watershed protection, shelter belts and protection of agricultural lands etc. will also yield some industrial wood. This development will be supplemented by the further opening up of hitherto totally or partly unexploited forests in Latin America, Asia and Africa, and the better knowledge and use of certain less-known hardwood species, which can reduce the growing strain on available supplies of coniferous species. The rapid expansion and the enormous possibilities of further increase in the Soviet Union's roundwood production should not be overlooked. It may gradually contribute toward greater supplies, chiefly of coniferous species, being made available for export.

Photos: p. 5 FAO; p. 7 Caterpillar Tractor Co.; p. 11 Whites Aviation Ltd.

Arid Zone Research

Mr. S. N. Navqi, Director, Pakistan Meteorological Service, who is a member of the UNESCO Advisory Committee for Arid Zone Research, left Karachi for Paris recently to attend the tenth session of the Advisory Committee. One of the items on the agenda of the committee is the consideration of an integrated survey of an arid country by a team of UNESCO experts. If this scheme is accepted, Pakistan is likely to profit greatly, because a major part of West Pakistan is arid or semi-arid. Such a survey is expected to provide data for the preparation of a master plan for the harmonious development of West Pakistan on sound scientific lines.

In the forest regions of Rotorua, showing densely clad hill slopes

May and Baker Film

May and Baker Ltd., Dagenham, Essex, England, recently showed for the first time a new technical film entitled 'Fine Chemicals for Horticulture and Agriculture'. This is a 16-mm. colour film with sound and has a running time of 20 minutes.

Checking results during a laboratory experiment in weed control

The film shows the main stages in fine chemical product development from the research stage to final packaging. It also outlines some of the ancillary services necessary for a chemical organisation serving agriculturists throughout the world.

Emphasis has, naturally enough, been placed on agricultural and horticultural products. In one section of the film some of the methods of testing growth-regulating substances has been spotlighted. And so a logical sequence of research, production, analysis and packaging has been set forth very clearly in this well-produced film.

Arrangements will be made to show this film to horticultural and agricultural groups upon application to any of the associated companies in Australia, Canada, India, New Zealand, South Africa and Lagos, West Africa, or at any of the branch offices.

Hungary's Soil-Improvement Programme

The Hungarian News and Information Service have reported that a big extension of the soil-improvement programme during the next five-year plan starting in 1956 is announced in Hungary.

In the next five years 420,000 acres of acid and sodaic soil will be treated. The area to be treated in 1956 is 70,000 acres and the acreage will increase year by year.

In the first five-year-plan period 112,000 acres of acid and 63,000 acres of sodaic soil were improved.

Agricultural Development in St. Helena

NORMAN HUMPHREY
(*Agricultural and Forestry Officer*)

Forest and pasture reclamation is the main theme of this article by Mr. Humphrey. The subjects of coffee growing, irrigation and land settlement are treated more briefly.

ST. HELENA is an island of volcanic origin, some 47 sq. m. in extent, lying remotely in the South Atlantic. In the days of sail and before the opening of the Suez Canal it was important strategically and economically as a port of call on the long route to India and the Far East. During those days the island was relatively prosperous, but with their passing towards the end of the last century St. Helena entered on a period of economic difficulty from which it has still to emerge. The problem thus presented has been rendered all the more formidable by the fact that man's activities during the last three centuries have led to the loss of much of the natural wealth of the soil through erosion. Large-scale destruction of the natural forest which once covered most of the island, together with the depredations of goats, led to some two-thirds of the land being reduced to waste. More recently, probably largely owing to the decline in prosperity, farming standards declined, walls and fences decayed and pastures became a prey to uncontrolled grazing by all kinds of stock.

Early in the present century the cultivation of New Zealand hemp as an export crop was begun and most of the higher parts of the island were planted with this crop. In due course the industry became fully established and the fortunes of the island have since been dominated by the rise and fall in the demand for this product.

At the end of the war, St. Helena, like other Colonial territories, adopted a 10-year development plan in which the improvement of agriculture had a major place. The proposals covered a fairly wide field, but emphasis was laid on soil conservation, reafforestation and a search for alternative export crops. These were the obvious essentials if farming in St. Helena was ever to be put on a sound basis. At the same time, they were developments which could not be expected to show quick results. It is with these matters that this article is mainly concerned.

Hay-making at Pouncy's, a field owned by the Department of Agriculture and Forestry. Four years ago it was showing severe signs of overgrazing and it was beginning to erode

Reafforestation

The indigenous forest cover of the island was of a unique character, comprising species found nowhere else in the world. Of this today there remains only a fragment found mostly along the crest of the central ridge. Goats and men combined not only to destroy the island flora, but also to lay bare the slopes of the valleys to the destructive effects of erosion. These valleys are, in fact, ravines torn out of the volcano's side in the faraway days when it was in active eruption.

From time to time in the past, efforts were made to encourage the planting of trees, and Governor Beatson, in particular, did much to introduce new species into cultivation early in the last century. These efforts, however, did little to check the over-consumption of timber and wood fuel, and the uncontrolled goat population prevented any form of natural regeneration from taking place.

Reafforestation began again just before the war and was powerfully assisted early in the war when a ' goat line ' was demarcated around the island below the 1,500-ft. contour. Within the line no goat was permitted to range. The effectiveness of this measure is today very apparent on the northern side of the island, where natural regeneration by pines and Port Jackson willow (*Acacia longifolia*) has clothed many bare slopes with a forest cover. On the southern and windward

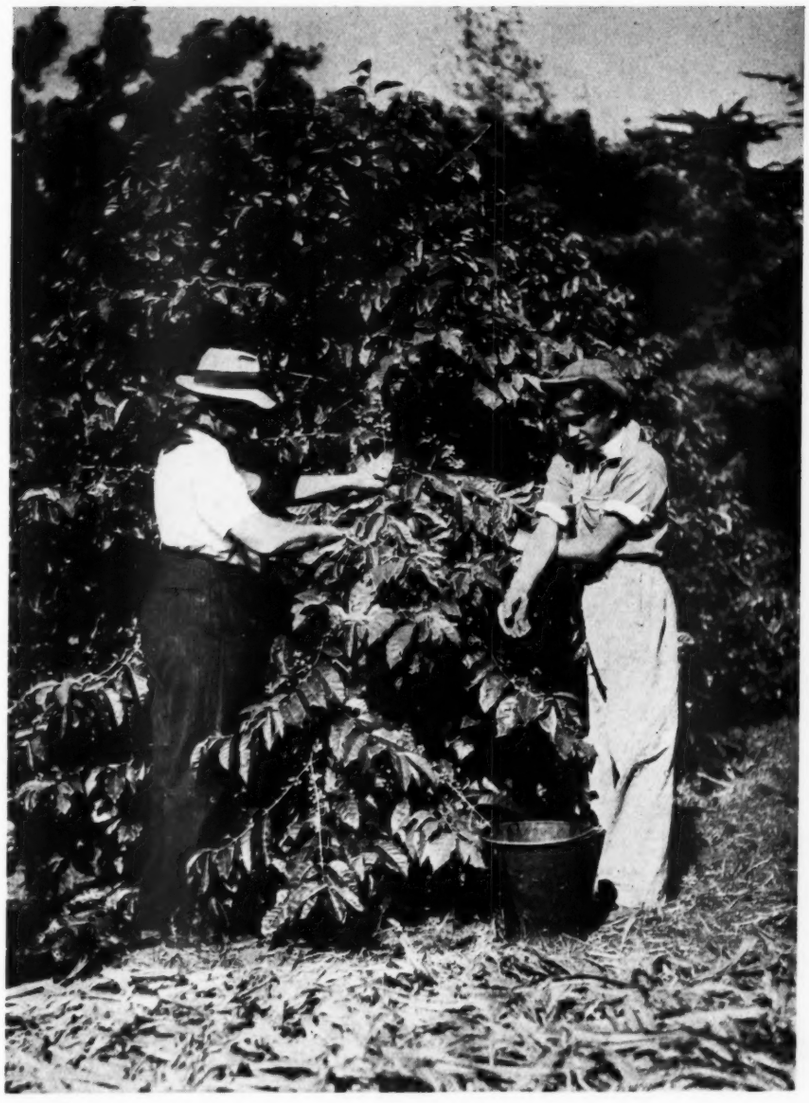
side of the island, however, past deforestation had been so complete that natural regeneration has been limited to a few of the higher slopes and the bulk of the Crown Wastes still remain barren.

Two methods

Since the war reafforestation has followed two main lines. The first of these has been the improvement of old, and the planting up of new, forests in the high lands, which form the main catchment area of the island. Here trees for timber as well as for fuel can be grown, though in the former case the choice of species has been made more difficult by the presence of an Australian species of wood termite, which attacks living trees from below ground and can eat out the heart of a mature tree without giving any external evidence of its presence. Certain species of trees have been found to be more resistant than others and trials are being continued with new kinds, bearing this point well in mind. As most of these forests are on very steep slopes, a policy of mixed planting and selective felling has been adopted in preference to pure stands and clear felling.

The second line of policy is the establishment of a forest belt around the island between the fertile interior and the barren lowlands. Though there are serious gaps in places, the outline of this belt can now be traced on the northern side of the island and one can expect that the most important gaps will be filled during the next few years. On the southern side, however, the belt is still non-existent and its establishment will be a long process. Here, in one large area, an experiment is being tried, which aims at getting enough trees of pine and Port Jackson willow established to enable full reafforestation to be completed by natural regeneration. Should this experiment prove successful, it would make further reclamation of these barren areas a comparatively cheap undertaking. The experiment has been going for less than 18 months and it is still too early to appraise it, but there is ground for hoping that the method will prove satisfactory. A nursery has been established in this area and plantings of other species in the usual way will also be carried out in suitable places.

Finally, mention should be made of the new Forestry Ordinance which was enacted in 1954. Under this Ordinance three types of forests can be constituted: national forests on Crown land; dedicated forests on private land, but managed by the Forestry Department; and protected private forests, which will be managed by private landowners on sound forestry principles. Good progress is being made with the constitution of national forests and some private land is also in process of being brought under the Ordinance. It is hoped that in due course further areas of private forest will become constituted forests as the value of the forest estate is more generally recognised.



Picking coffee at Scotland, the nursery garden belonging to the Department of Agriculture and Forestry. Island coffee won first prize at the Crystal Palace Exhibition in London in 1851. Efforts are being made to revive and extend production

Saving the pastures

The first step in pasture reclamation was to safeguard from further deterioration the grasslands in the high country. As in other territories, progress was handicapped at first by shortage of materials. However, the Department made a start with the permanent fencing and subdivision of certain Crown lands and used these to demonstrate the effects of grazing control and good pasture management. In 1952 a great impetus to this work was given by the largest private landowning firm who initiated a programme of better land utilisation, which has completely transformed

An example of erosion at Netley's Gut. Reclamation work has begun. The valley is to be seeded with grass and the slopes planted with trees

their pastures. Of necessity this entailed a heavy reduction of stock numbers which it will take time to replace, but already they have a useful dairy herd established and are raising pigs in some number to help the meat supply.

With the improvement of the pastures, haymaking has returned after having been abandoned more than 25 years ago. Silage-making and the cultivation of fodder crops are also playing their part in putting animal husbandry on a sound basis.

The closure of pastures inevitably affected the small man, who had become accustomed to letting his animals roam at large. Reduction in numbers has been necessary here, too, but at the same time more positive action has been taken by the Government—in two cases with the ready assistance of the big firm—by the acquisition of land for the benefit of the small farmer. Furthermore, with the completion of rehabilitation work in the high country, the Department has been able to make a start with reclaiming denuded pastures elsewhere. The most ambitious of these reclamation schemes is at Deadwood in the Longwood area.

Deadwood comprises one of the largest pieces of gently sloping land on the island. Its grass cover was giving way to *Mesembryanthemum* under stress of over-grazing; its very existence was threatened by erosion of the steep slopes which bounded it. Although it was not feasible to close the whole area to stock, it has been fenced completely and is being reconditioned section by section. The weather of the last year or so has been very favourable for this kind of work and results to date are most encouraging.

Other promising developments

Reference has been made to the need for alternative, or subsidiary, export crops to strengthen an economy at present wedded to New Zealand hemp. The possibilities are limited both by St. Helena's remote situation and by the fact that the area of land suitable for arable cultivation is small. Nevertheless, certain developments are hopeful. Efforts are being made, with the co-operation of the firm referred to above, to increase the trade in garden produce with calling ships. Work, too, is continuing in an attempt to re-establish a small but valuable trade in lily bulbs; this suffered severely first from the war and then from eelworm attack and possibly nutritional deficiencies.

Coffee growing

Coffee growing is also being reconsidered. St. Helena coffee won a first prize at the Great Exhibition of 1851, but interest in it declined and the trees were neglected. Recently small farmers have been encouraged to take their coffee in hand and to plant more trees, but much more will be required to bring the crop into the export market. Capital would be necessary in some form or another; indeed, lack of financial backing is a major difficulty in bringing back prosperity to the small farmer.

Water supplies

Mention should be made of a report on the water supplies of the island submitted at the end of 1954 by an irrigation engineer. This suggests that it may be possible, by the construction of a dam in a large valley on the east side of the island, to irrigate some 100 acres of land. Should this proposal prove practicable—and this depends on the result of soil analyses—it would be of inestimable value to the island's agricultural economy.

Small farmers

Lastly, serious consideration is now being given to the problem of land settlement by small farmers. Schemes of this nature need much thought and the right conditions if they are to have a reasonable prospect of success and the time has not been ripe for such planning until now. The Government has recently appointed a Land Settlement Advisory Committee and it is hoped that concrete proposals will be put forward at an early date.

Much, then, is happening in St. Helena today. Deterioration proceeded too far in the past for the damage to be quickly repaired. But results are now beginning to show. As more than one visitor has put it, ' the island now looks as though it is being cared for '. There is still much to be done before natural resources will be safe from further loss, but, on the foundations now being laid, there is hope that a sound and more prosperous future may be built for St. Helena's farming community.

Photos: Violet Gilmour.

Postwar Development in West German Agriculture*

DR. F. RIEMANN

(Institut Agrarwesen und Wirtschaftpolitik, University of Göttingen)

Dr. Riemann presents the fifth article in the series prepared by specially invited correspondents. Many little-known facts dealing with agricultural moves in Western Germany have been revealed. Labour and economic difficulties are acute, but Dr. Riemann forecasts a bright future for the West German farming community.

IN 1945 the farming community of Western Germany was faced with an entirely new task; vast areas of Central and Eastern Germany, where more food was produced than was consumed by the population, had been lost to the Federal Republic. At the same time, the population of the West had greatly increased in number through the unceasing influx of refugees. Therefore, means had to be found to produce sufficient food in the West to feed this increased population. In 1939 there were 42.1 million people living within the boundaries of what is now the Federal German Republic, including West Berlin. At that time there were 290 inhabitants to every 100 hectares (ha.) of agricultural land. At the time of writing more than 52 million people live in the same area. This represents an increase of some 10 million people. The same 100 ha. are now expected to feed 370 people. Very great efforts have had to be made to reach this target.

Changes

The task was rendered even more difficult by the fact that some 40% of the 35.1 million acres of agricultural land was grassland, two-thirds of which was used as meadows, the remaining one-third as pastures. Table 1 illustrates the changes which have taken place since prewar days.

The increase in the horticultural acreage is mainly due to food shortages in the immediate postwar period. At that time many families suddenly discovered that they were keen gardeners and they have kept up gardening ever since. During those years there was also a ready market—even if it was the black market—for anything connected with livestock. Consequently, in spite of official exhortations to the contrary, the acreage under grass was vastly extended at the expense of the acreage under crops. It is a well-known fact that, in organising their farms, farmers are apt to rely on prices as their guiding principle. For this very reason, however, it is also possible for the authorities to direct agricultural production into the right channels by applying the appropriate kind of price policy (see Table 2).

At first the prices for corn lagged behind the prices for other products, especially those for root crops and livestock. The farmers of Western Germany were thus not encouraged to step up the production of corn crops, although the grain shortage was more acute than that of any other foodstuff. The position did not change until, in the early 'fifties, grain prices were fixed at a substantially higher level. Since then grain-growing farms have paid handsome profits; they have also benefited by the high degree of mechanisation in their particular field, which does away with the need for large numbers of highly paid farm-hands.

Intensive farming

Three-quarters of the food consumed in Western Germany today is home-produced. This cannot be accounted for by increased productivity alone. In recent years there has also been a switch to high-yielding crops, and more and more attention is paid to productivity in agricultural circles (see also Table 3).

In the immediate postwar years intensive farming of this kind was mainly carried out at the expense of the acreage under corn. Root crops, vegetables, plants for industrial use and even fodder crops took precedence over grain crops. This was mainly due to the price situation outlined

The farm building known as 'Der Hiesterhof', Lüneburgerheide, Niedersachen

* Translated by M. M. Pottlitzer

TABLE 1
AGRICULTURAL LAND IN THE FEDERAL REPUBLIC, %*

	1935–38	1950	1954
Arable land	59.0	56.5	57.1
Horticulture†	2.6	3.5	3.4
Grassland‡	24.8	25.8	25.2
Pastures	13.1	13.6	13.8
Viticulture	0.5	0.6	0.5

* Unless otherwise stated, these and the following figures are taken from official digests of statistics.
† Including orchards and nurseries.
‡ Including meadows producing only straw-litter.

TABLE 2
DEVELOPMENT OF PRODUCER PRICES
(Index figure for 1938–39 = 100)

	1948–49	1949–50	1950–51	1951–52	1952–53	1953–54	1954–55
Corn and pulses	131	132	161	215	210	207	207
Root crops	165	187	141	202	220	200	188
Vegetables	263	217	133	266	262	181	338
Total vegetable products	171	169	151	201	204	192	197
Milk	185	170	160	171	177	170	180
Beef and veal	156	162	180	220	196	201	219
Pig meat	177	201	251	249	233	265	
All livestock products	187	190	186	201	193	196	204

TABLE 3
LAND UNDER CROPS, %

	1935–38	1950	1954
Grains and pulses	61.0	56.0	59.4
Root crops	22.3	25.3	25.2
Vegetables and garden produce	0.9	1.1	0.9
Plants for industrial use	1.0	1.3	0.5
Fodder crops	14.3	15.6	13.8
Bare fallow	0.5	0.6	0.2

TABLE 4
SELECTED CROP YIELDS, 100 KG./HA.

	1938–39*	1950–53	*Prewar* (100)†	1954
Rye	18.3	23.1	126	26.8
Wheat	22.3	27.4	123	26.1
Barley	21.2	25.4	120	26.2
Oats	20.7	23.7	115	26.2
Potatoes	168.2	219.8	131	225.0
Sugar-beet	327.2	342.8	107	355.0

* According to the Federal Ministry of Food, Agriculture and Forestry, these figures are underestimated by about 10%.
† Prewar refers to the years 1935–38.

above. Subsequently, when the necessary rationalisation of German agriculture was carried out, the growing of fodder crops was reduced, market-gardening was once more confined to certain areas best suited for it, and the cultivation of plants for industrial use declined owing to the great price fluctuations involved. Similar considerations applied to the growing of pulses. In the course of this development any acreage that was freed was ploughed under and the arable acreage under grain crops was again brought up to its prewar level.

The intensification of agriculture had a beneficial influence on crop yields (Table 4). The depression of the postwar period was soon left behind when the essential means of production, mainly fertilisers, were again available.

From the average results for the years 1950–53 it can be seen that these are not spectacular results achieved in particularly favourable years. We are witnessing permanent increases in production, which have been further confirmed by the yields of the last few years. Even if we accept the statement by the Ministry of Food that, owing to indifferent methods of computation, prewar yields may have been underestimated by as much as 10%, we are still faced with increases in yield of 15–20%, especially for rye and potatoes. The price of rye has never stood so high before compared with that of wheat. Owing to this particular trend of the market, rye is no longer grown only on poor soil; this fact also contributes to higher average yields.

Changes in arable acreage and increased yields have not failed to influence the amount of the harvest. The figures given in Table 5 may serve to illustrate the special economics of the food situation in Western Germany.

In prewar years sugar-beet was mainly grown in Central Germany, whereas the main rye and potato crops came from Eastern Germany. After 1945 the centre of production for these crops shifted to the West to such an extent that enough is now available to satisfy the needs of the population. At the same time, the need for oat crops has been substantially reduced, as, owing to the steadily progressing mechanisation of agriculture, the number of horses needed on the farms has greatly decreased.

Application of fertilisers

It must, however, be remembered that agricultural production could not have been stepped up to such an extent without the increased application of artificial fertilisers.

It will be seen from Table 6 that the quantities of lime used from year to year are subject to great fluctuations. At first sight the application of artificial fertilisers may not seem to amount to very much. It should, however, be realised that more than one-third of the agricultural acreage is grassland, where until now artificial fertilisers have not been widely used. We must also remember the size of the average farm, because, as a rule, only the larger holdings use large quantities of artificial fertiliser. In the 'Laender' of the north-west (North Rhine/Westfalia and Lower Saxony), where the size and layout of the holdings are more suited to the use of artificial fertilisers, we find that, in fact, more artificial fertilisers are being used than in the other Federal States (see Table 7).

The quantities of fertiliser used in the north-west are sometimes twice

A typical Schleswig-Holstein farm. Most buildings, including the farmhouse itself, are thatched. The thatching is, as a general rule, very carefully done

those used in the south. The difference in the size of holdings referred to above may partly account for the divergency. Added to this there is certainly a lack of knowledge and technical education amongst the peasantry of southern Germany. The authorities are therefore speeding up the development of agricultural colleges and centres of advice on farm management.

Rationalisation of livestock

During the second world war and immediately after the war, livestock in Germany suffered heavy losses. There was a shortage of pig food, as potatoes and grains were reserved for human consumption. To maintain even the minimum meat ration for the population cattle slaughter on an extensive scale became unavoidable. Only the number of horses showed a marked increase, because tractors and motor fuels were in short supply, and, when German currency deteriorated the horse represented some kind of financial security. Similarly, there were more goats and sheep kept, as they helped people to become self-sufficient, and food for them could be more readily obtained than for poultry. The number of poultry dwindled in consequence (see Table 8).

TABLE 5

HARVEST YIELDS OF SOME SELECTED PRODUCTS, 1,000 METRIC TONS

	1935–38	1950	1954	*Prewar* (100)
Rye	3,017	3,021	4,098	136
Wheat	2,515	2,614	2,893	115
Barley	1,723	1,472	1,920	111
Oats	2,826	2,545	2,473	88
Total grains*	10,487	10,206	12,590	120
Potatoes	19,538	27,958	26,769	137
Sugar-beet	4,253	6,975	9,013	212

* Including maize

TABLE 6

APPLICATION OF ARTIFICIAL FERTILISERS, KG./HA.

	1938–39	1950–51	1953–54	1954–55	*Prewar* (100)
Nitrogen (N)	23.6	25.6	31.0	31.7	135
Phosphoric acid (P_2O_5)	28.3	29.6	32.1	36.4	129
Potash (K_2O) ..	43.4	46.7	58.5	60.2	139
Lime (CaO)	56.4	47.5	62.2	42.6	75

TABLE 7

USE OF ARTIFICIAL FERTILISERS IN THE FEDERAL STATES OF WESTERN GERMANY, KG./HA. (1954–55)

	Nitrogen	*Phosphoric acid*	*Potash*	*Lime*
Schleswig-Holstein ..	34.4	43.4	62.3	44.6
Lower Saxony	41.4	43.5	80.1	53.4
North Rhine/Westfalia ..	48.3	46.7	85.6	65.7
Hesse	34.0	35.9	57.2	49.5
Rhineland/Palatinate ..	35.7	38.7	56.1	22.7
Baden/Württemberg ..	19.4	24.0	38.3	15.9
Bavaria	19.5	29.1	44.4	38.2

TABLE 8
LIVESTOCK, 1,000 HEAD

	1935–38	1949	1950	1954
Horses	1,541.5	1,629.4	1,570.4	1,717.7
Milk cows	5,990.2	5,535.0	5,734.1	5,776.9
Other cattle	12,114.3	10,882.6	11,148.5	11,520.9
Pigs	12,494.0	9,697.7	11,890.4	14,525.0
Sheep	1,888.7	2,019.6	1,642.5	1,225.5
Goats	1,376.1	1,444.7	1,247.2	899.9
Poultry	51,124.0	39,957.0	48,064.0	55,092.0

TABLE 9
ANIMAL PRODUCTS

	1935–38	1950–51	1953–54
Cow's milk, 1,000 metric tons	15,000	14,610	17,201
Milk per cow, kg./year	2,480	2,560	2,924
Eggs, millions	4,300	4,989	5,851
Pig meat, 1,000 metric tons	1,020	880	1,134
Beef and veal, 1,000 metric tons ..	552	473	635
Total meat, 1,000 metric tons .. .	1,897	1,642	2,095

TABLE 10*a*
PERMANENT LABOUR IN WEST GERMAN AGRICULTURE, IN THOUSANDS

	1939	1949	1954	*Change*, +%
Labour recruited from farmers' families	4,482.9	4,740.7	3,950.3	−11.9
Subdivided into:				
Farm managers	1,244.2	1,250.9	1,303.7	+ 4.8
Farmers' family members ..	3,238.7	3,489.8	2,646.6	−18.3
Labour recruited from outside ..	809.2	1,127.8	830.5	+ 2.6
Total permanent labour	5,292.1	5,868.5	4,780.8	− 9.7

TABLE 10*b*
CASUAL LABOUR RECRUITED FROM FARMERS' FAMILIES, IN THOUSANDS

	1939	1949	1954	*Change*, +%
Farm managers	747.0	635.0	573.2	−23.3
Farmers' family members ..	461.6	545.0	831.4	+ 80.1
Total	1,208.6	1,180.0	1,404.6	+ 16.2

Return to more normal economic conditions brought new changes in livestock breeding. Pig- and poultry-keeping increased above prewar levels to meet the needs of a larger population. The number of cattle increased likewise, though not to the figure reached in the 'thirties. Sheep- and goat-keeping declined, as people no longer relied on these stocks for self-sufficiency. At the same time, the horse was robbed of the dominant position it once held by the great strides made in the mechanisation of agriculture.

To sum up, it can be said that livestock breeding shows the same rising tendency in output as agricultural crops.

The upward trend is best shown by the fact that the milk yield per cow has risen by 20%. The meat yield of cattle has increased to a similar extent—in spite of smaller herds—and has kept pace with the increase in population. Egg production also shows a remarkable increase (see Table 9).

Mechanisation of farm work

In Western Germany, as in all highly industrialised countries, there has been a marked tendency to replace draught animals and man-power by mechanical devices (see Tables 10*a* and 10*b*).

The figures for 1949 show again the changes brought about by wartime conditions. The general economy was still unable to absorb large numbers of people so that many workers tried to find employment on the land. Wages were often paid in kind, and this, of course, acted as an added inducement. The position suddenly changed again as soon as the industries of Western Germany were reorganised and rebuilt. Compared with 1939, the agricultural economy of Western Germany now employs 600,000 fewer members of farmers' families. As things are now, younger sons and daughters of farmers look for work which guarantees them larger pay packets and early opportunities to set up families of their own. To offset this loss to the farming community the number of full-time farmers has grown. Farmers often have to give up non-agricultural part-time work when their children leave the home to find employment outside agriculture. For the same reason, a slightly greater number of farm-hands come from outside the farmer's family than in prewar days.

Children of farmers who find outside employment need not be permanently lost to the land. Many of them return to lend a helping hand at times of high pressure and work on the farm either part-time or after their own working hours. Since 1939 their number has risen by 370,000, *i.e.* about 80%.

Productivity

It may safely be assumed that the figure of 4.8 million people alleged to be permanently employed in West German agriculture is too high. In computing the relevant figures no distinction has been made between domestic labour and actual farm labour. Leaving aside the people employed on housework in rural households, we are left with about 3.2 million people who are, in fact, permanently employed in agriculture. This means 23 workers per 100 ha. of arable land. In spite of the reduced number of workers, there is a marked increase in output both per acre and per worker.

The increase in productivity (Table 11) indicates that the more extensive use of mechanical devices more than outweighs the loss of draught animals and of human labour. Large sums have been spent on mechanisation; in

TABLE 11
PRODUCTIVITY
(1938–39 = 100)

Output	1946–47	1950–51	1953–54
Per area ..	62	103	117
Per worker	53	101	122

1954 more than 1,000 million marks (= £83 million sterling) were spent on agricultural machinery and tractors. It can be assumed that these expenses are steadily increasing, because in the first nine months of 1955 as many as 80,000 new tractors had been purchased.

To quote only a few examples: Between 1949 and 1954 the number of combine harvesters rose from 149 to 5,300; milking machines from 5,600 to 75,000; manure distributors from 130,000 to 159,000; multiple implements from 74,000 to 106,000; blower-cutters from 21,000 to 43,000; tractor ploughs from 61,000 to 225,000. The most significant increase is with tractors; there were about 450,000 on 1 October, 1955. This has considerably changed the pattern of tractive power used in agriculture (see Table 12).

Two things are obvious: the total tractive power per ha. of arable land has grown by nearly 50% since prewar days and the total animal tractive power, which before the war supplied some 95% of the total tractive power, has lost most of its importance. Mechanical tractive power is likely to account for more than half the present total.

The mechanisation of West German agriculture has not been confined to the small number of large holdings. As early as May 1953, the last period for which reliable figures are available, nearly two-thirds of the tractors used were to be found on holdings of less than 20 ha. At that period two-thirds of all holdings between 20 and 50 ha. and one-third of all holdings between 10 and 20 ha. owned tractors. Since then an additional 200,000 tractors have been acquired, mainly by medium-sized and small holdings, greatly speeding up their rate of mechanisation. The same conclusion may be reached from the fact that more than half of the recently purchased tractors are of less than 17 h.p. Small-holdings of less than about 10 ha., which could not normally afford tractors of their own, have been advised to share them on a co-operative basis. This type of tractor co-operative, consisting of two to four farms, has been encouraged by cheap loans made available by the Federal Government. Commencing with the second half of 1951, credits of this kind have been granted to more than 4,500 tractor and combine-harvester co-operatives.

Harvesting hops near Tettnang in Württemberg-Hohenzollern. Production in West Germany in 1953 was 15,600 metric tons from 8,300 hectares. The 1938 production was 9,100 metric tons

TABLE 12

TRACTIVE POWER IN AGRICULTURE* (× 1,000) AT THE END OF EACH YEAR

	1935–38	1949	1950	1951
Number of tractors	†30	103	181	370
Tractive power (T.P.):				
Draught-horses over three years (1 T.P.)	1,256	1,208	1,180	1,070
Draught oxen (0.5 T.P.)	158	162	126	80
Draught cows (0.2 T.P.)	394	366	355	313
Total:				
Draught animals	1,808	1,736	1,661	1,463
Tractors (1 h.p. equiv. to 0.2 T.P.)	100	380	684	1,330
Total T.P.	1,908	2,116	2,345	2,793
T.P. per 100 ha. arable land	13.1	14.9	16.5	19.7

* Taken from *Agrarwirtschaft*, special issue of *Landwirtschaft und Markt* (Agriculture and Market), Hanover, 1954, completed by the author.
† On 17 May, 1939.

Present-day agricultural policy

During the first few postwar years the Federal agricultural policy was entirely concentrated on achieving an immediate rise in production. As a result of this policy, the demand for a number of products, such as rye and potatoes, can now be met by home production. There are still large gaps to be filled by imports, for instance, wheat, fodder crops and oil seeds. Occasional imports, mainly due to slight annual fluctuations of crop yields and output, are necessary for sugar, beef and butter. It is, therefore, one of the most urgent tasks for the Government to co-ordinate the output potential of German agriculture with both the requirements of the home market and the export offers of foreign trade partners.

To continue the rationalisation of agricultural productivity in the face of the difficulties inherent in the structure of German agriculture provides yet another problem. All kinds of remedies have been adopted to provide small-holdings with larger acreages and to enable them to apply modern methods of cultivation. To overcome the shortage of man-power on the land, attempts are being made to induce more married farm-hands to take up agricultural work.

The most difficult problem of all is the integration of farmers and farm-workers who have come over as refugees from Eastern Germany into the farming community of the West. Opportunities to do so are scarce because of the shortage of arable land. However, about 360,000 ha. have been provided for the settlement of 65,000 families. They were used for 20,000 full-sized farms with a total acreage of 280,000 ha. and the remainder were split up into small settlements, which the refugees cultivate in addition to taking up other employment. By this method at least part of the refugees were absorbed by the West German farming community. As there are still untapped resources, it is to be hoped that the number of families settled again on their own soil and cultivating their own land will be further added to in the years to come.

This brief survey may suffice to show that the reorganisation of German agriculture can be regarded as concluded. It must, however, not be forgotten that there still remain a number of problems to be solved if agricultural progress is to keep pace with the progress made in other branches of the Federal economy. They must be solved in order to provide the farming community with the same chances of prosperity as are enjoyed by men and women in other walks of life.

Photos: German Tourist Information Bureau, London.

South African Agricultural Developments

(From our South African Correspondent)

FARMERS growing most sorts of crops under South African conditions have had a successful year and the prospects for 1956 seem promising.

Maize

The winter in South Africa is often a period of anxiety for farmers both in the wet Cape and the bitterly cold Transvaal highveld. This year (1955) the winter was particularly kind to farmers. The heavy crops of maize reaped in the Transvaal and Orange Free State were stored in many parts of that huge area in newly erected stores with corrugated-iron roofs, but considerable quantities of maize had also to be stored in the open under canvas. Efforts are still being made to find export markets for South Africa's huge surplus, but the quantities so far shipped out have not made much impression on the huge reserves. It is estimated that during the current season the maize growers reaped a harvest that earned for them about £55 million. The current season's maize crop is estimated at 36,579,000 bags, as compared with an estimated crop of 39,177,000 bags last year, according to the Division of Economics and Markets. Crop prospects for wheat and other winter cereals are equally favourable. The harvesting season for maize was prolonged this year because of the excessive moisture in the grain, but by the last quarter of the year all the deliveries to the elevators had been completed.

Varying reports have been made on the yields, as it seems that the harvest from a number of the leading crop-producing regions did not come up to expectations, a fact that was only evident after threshing had started. Then it was found that lands with what seemed outstanding growths of maize were, in fact, producing less than they had done in the previous season. Apparently these reduced yields were due to the excessive rains during the year and also to the severe frosts encountered.

Wheat

While the winter rains in the wheat-producing areas of the south-western Cape were rather late this year, when they did at last come they were well up to normal levels, so that the wheat and other winter cereal crops came on well and, while no estimates have so far been published for this crop, it is anticipated that the wheat reaped this season will show no decline from the averages for previous seasons, not only so far as the winter-rainfall areas of the Cape are concerned, but also in regard to the summer-rainfall areas of the Orange Free State, where, in recent years, good crops of wheat have been raised. Here, also, no estimates of ultimate yield have been forthcoming, but it is evident that if there is no serious deterioration in the weather the wheat harvest from the Orange Free State will also be satisfactory. In spite of the good yields of wheat, it is still necessary for South Africa to import many of these requirements; such imports reach between two and three million bags each of 200 lb. annually. Stocks of about six million bags are currently being carried, providing an adequate reserve in line with anticipated requirements over the next few months.

Fruit

The renewal of the ocean mail con-

tract between the Union Government and the Union-Castle Line for a further period of 10 years and the agreement with the Conference Lines for certain freight increases may have the effect of of increasing the price of South African fruit in a number of export markets, but it also means that in due course more refrigerated space will be available for the export of such fruit. In fact, the limited amount of refrigerated space available for such exports has for some time been a source of anxiety to local farmers, who have had as a consequence to export a percentage of such cargoes as unrefrigerated merchandise. Although the oversea markets for South African fruit seem to be more competitive now than in previous years, the local fruit-growers have every confidence in their ability to maintain such exports at a profitable level. Thus the local fruit-growing industry is planning for expansion in both the local and export markets. During 1955 the weather was favourable in the leading fruit-growing districts of the Cape and the Transvaal. In the Cape last winter soaking rains fell in many of the fruit-growing regions and in the south-western districts the heavy falls of snow capped the mountains with white, the cool, moist conditions resulting proving beneficial to the dormant orchards and vineyards. In the spring farmers were reporting promising developments, so that the eventual yield has every prospect of being up to at least the standard of previous years in both quality and quantity.

A citrus grove in Natal, South Africa. It is expected that the annual production of citrus will reach 10 million cases, each of 70 lb., by 1960

Citrus

During the year citrus exports to Britain were well maintained, the sales there being better in 1955 than in the previous year, but more competitive conditions were encountered in Scandinavian and other export markets. At the annual general meeting of the South African Co-operative Citrus Exchange the chairman said that general prospects were better in the export markets in the first half of 1955 than they were in the second half of that year, because the Californian crop appeared in the export markets then and cut into much of the South African trade. Citrus production in South Africa continues to rise, and it is now expected that by 1960 the annual production will be at least 10 million cases of 70 lb. each. It is obvious that the marketing of so large a crop will be attended by numerous problems, which would be easier to solve if growers produced the best quality fruit of the right variety. It was recently revealed that the 1954 citrus season yielded a record crop of 8,782,898 cases, an increase of 1,392,321 cases over the previous next best figure, that of the 1953 season. Exports rose from 5,220,047 cases in 1953 to 6,379,329 cases in 1954, but the shipments to Britain dropped from 3,728,701 cases to 3,462,476 cases; against this exports to other markets oversea rose from 1,225,121 cases to 2,650,628 cases. Total exports of citrus during the 1954 season earned a gross total of £13,088,375.

Sugar

During the current sugar season dry conditions have been persisting in Natal, although during October there were several heavy falls of rain, with colder conditions than had been known for several years. The dry weather over much of the current season, together with the frosts, have speeded up the ripening of the cane, the sucrose content of which, in general, has been satisfactory. Crop prospects for the current season have justified the optimistic expectations of the early stages of development, so that there is little doubt that the yield of sugar in the current season will at least equal the record figures of the past season. Deliveries of mature cane were well under way in the second half of 1955 and this was followed by steady progress in crushing. During the 1955 season there were some areas in which drought conditions had an adverse effect on the canefields, but in general the cane remained in good condition, and when the rain came it helped to improve the cane, much of which had retained its healthy condition during the worst of the drought. The South African Sugar Association Council states that during the last quota year the industry almost met the export quotas provided for under the Commonwealth Sugar Agreement, and as these quotas are not likely soon to be raised the higher sugar yield in South Africa will have largely to be absorbed by the local market. There the demand for sugar is increasing, so much so that by 1960 the local consumption will be in the neighbourhood of 700,000 tons a year. This means that if the export quotas remain more or less on the present basis there will be a demand for some 954,000 short tons of South African sugar a year.

Afghanistan

The 1955 sugar-beet crop has been reported as satisfactory. Improved methods have resulted in the collection of about 150 tons of beet seed at an official estimated saving of $80,000 worth of foreign exchange.

The State of Agriculture in Israel

DR. L. E. SAMUEL

(Economic Adviser, Israel Ministry of Agriculture)

An increase in land colonisation, investment capital and the export trade, together with an early settlement of the Jordan water-distribution controversy, are some of the agricultural problems that must be overcome if Israel is to increase or even maintain her present standards of living.

ISRAEL'S achievements in agricultural production may best be viewed and understood by a comparison between present production and production in the same area (which formed part of Palestine) before the new State of Israel was formed in 1948. Such a comparison is possible only on the basis of estimates, but these estimates may be considered reliable. They have been made not only on the basis of available data, but with a thorough analysis of the underlying statistics.

The comparison must be made separately for diversified farming and for citriculture, the latter, mostly organised in plantations, forming a separate unit.

Table 1, which shows the output of diversified farming, presents data only on food for direct human consumption and excludes fodder.

Table 1 shows clearly the sharp reduction in output between 1946–47 and 1948–49, the latter year being the first of Israel's independence. The reduction was relatively small for livestock products, about 18%. But the reduction in crops was heavy, almost 60%. These differences are due to the predominance of crop production in Arab farming. With the exodus of the large majority of Arab farmers from Israel's territory, large earlier cultivated areas could not be cultivated again immediately and plantations were neglected.

Total crop production in 1953–54 slightly surpassed that in 1946–47 and livestock production had been expanded by 50%. The total output shows an increase of over 25%. In Israel's diversified farming in 1953–54 the share of livestock production amounted to 54%; in Palestine's agriculture it amounted to only 45% in 1946–47.

Within Israel's agriculture the most pronounced development occurred in poultry farming and vegetable growing. The largest reduction, in comparison with the earlier period, concerns the output of bread cereals. Sugar-beet for sugar processing was not formerly produced in Palestine. In Israel sugar-beet production was begun, but sugar has not yet been processed from beets. As to oil-seeds to be manufactured into margarine and cooking fats, Arabs in Palestine relied on their olive plantations and on sesame production (not included in Table 1). Peanut production in 1953–54 was still too small to cover a substantial part of requirements; almost one-third was exported for use as table peanuts.

Output

If we consider in some detail the composition of output on Israel farms, we realise that emphasis in production has been given to protective food, *e.g.* milk, eggs, poultry meat and some beef, carp from fish ponds, vegetables and fruit, whereas bulk crops like wheat and oil-seeds were only produced on a relatively small scale. Production of fodder grains has increased since 1949, although still leaving a deficiency of roughly one-third.

Some 30 years ago Jewish colonisation agencies developed very small but fully irrigated farms, on which farmers made up to 70% of their income from livestock production and most of the remainder from vegetables and fruit. In recent years a determined effort has been made toward production of oil-seeds and sugar-beet, the latter to be rapidly expanded from 1956 onwards, when the first large processing plant will begin operation. A certain increase in wheat production is also planned, but progress in this field is slow.

Citrus production in former Palestine reached a peak of almost 19 million cases in the season 1938–39; 15.5 million cases were exported. A sharp setback occurred during the second world war, because the Mediterranean was closed for several years, so that exports came to a virtual standstill. Then, again, the Jewish Independence War resulted in neglect of

TABLE 1

OUTPUT OF FOOD FOR DIRECT HUMAN CONSUMPTION—MAIN COMMODITIES ONLY (CITRUS NOT INCLUDED)

Commodities	1953–54 *Quantities*	1948–49 *Quantities*	1946–47* *Quantities*
Milk (cattle and sheep), millions of litres	172	86	130
Meat, tons	4,400	2,600	11,000
Eggs, 1,000 units	400,000	242,500	200,000
Poultry meat, tons	8,800	5,000	5,000
Fish (pond), tons	5,500	2,700	1,300
Livestock production, value in Israel pounds adjusted to 1953–54 value†	96,210,000	51,795,000	63,295,000
Wheat, tons	35,000	21,400	90,000
Barley, durra for cereals, tons	—	—	30,000
Peanuts, tons	16,000	—	—
Vegetables and potatoes, tons	285,000	106,000	200,000
Fruit (citrus excluded), tons	52,000	28,500	60,000
Olives, tons	15,000	10,900	27,000
Crop value, Israel pounds*	81,270,000	32,035,000	76,970,000
Grand total, Israel pounds*	177,480,000	83,830,000	140,265,000

* £1 sterling has a value of Israel £5.
† Data on years of rainfall etc., similar to those in 1953–54, were used to make comparisons for crops.

Great steps have been made in the form of irrigation in the new State of Israel. The illustration depicts overhead irrigation in practice near Shuval, Northern Negev

groves previously in Arab possession. During the last two seasons, 1953–54 and 1954 – 55, overall production amounted to roughly 12 million cases, of which about eight millions were exported.

The main importing countries were the U.K. (60% and more), Scandinavia, Holland and Belgium.

Food consumption

By 1953–54 food consumption had reached a fairly high level. As to animal-protein food, consumption of eggs reached almost 300 *per caput* per annum and fluid milk consumption attained 75 l. (cream etc. included in terms of milk). Consumption of meat and fish amounted to perhaps 20 kg. only, but this consumption has been increasing steadily, notably due to the large increase in local production of poultry. Consumption of vegetables and potatoes was satisfactory, over 150 kg. Fat consumption, including that of surplus butter, attained a level of about 15 kg., complemented in some months by a cheese surplus of high fat content. Sugar is rationed at 12 kg. per annum, but there was an ample supply of jams, marmalade and sweets. Bread has been available without any limitations.

The overall share of local products in the total was, in 1953–54, between 55% and 60% at farm and c.i.f. prices, imports of feeding-stuffs being disregarded. Imports were heavy for wheat, oil-seeds, sugar, skimmed milk powder, butter, cheese and, comparatively, in fish. Local production covered demand in eggs, poultry meat, fluid milk and cream, vegetables and fruit, and carp from ponds.

Targets in local production

The question as to how far local food supplies could meet requirements beyond the present level of 55 to 60% cannot be answered with a great measure of certainty. The author believes that the optimum level will be attained at roughly 70% of food consumption, determined at 2,850 to 2,900 calories *per caput* per day, 30 to 35 gr. of animal proteins and 85 to 90 gr. of fat. There will remain during the coming three to five years large imports of bread grains, probably 60 to 65% of requirements, 30 to 40% of oil-seeds, 50 to 60% of sugar and perhaps 60% of beef. Beef may be replaced by mutton if sheep farming is stimulated and expanded rapidly. Coffee, tea and cocoa must remain imported products.

Agriculture, as a resource for fibres, has scarcely begun. Cotton production started and seems to be succeeding; flax-seed is being grown. But, in comparison to requirements, we shall need a number of years to reduce imports substantially.

In addition to supplies for local markets, exports may increase gradually to a considerable extent. The value of citrus exports, including that of by-products, amounted in 1953–54 to almost $40 million. Export, on a larger scale, of some vegetables and fruit is being planned, but the export of vegetables and certain kinds of fruit in seasons of short supply constitutes a difficult matter in many aspects and it may take, say, between five and 10 years until exports half the value of citrus exports may be effected.

Another target is to reduce imports of feeding-stuffs to the very minimum; this will probably consist of animal-protein meals. In this field progress has been pronounced.

Achievement of production targets

Influence on price formation in general.—Prices of all locally produced foodstuffs have been protected against imports based on lower production costs abroad in a way almost excluding competition. Through a complicated scheme of guarantee prices in various forms, in part coupled with subsidies, prices received by farmers have time and again been adjusted to the declining purchasing power of our currency. In this way the standard of living of farmers has been maintained on a high level and surpassed that in prewar times; a precondition has been full equipment and adequate supplies of both revolving and investment credit at a reasonable interest. Young settlements have enjoyed additional protection through higher guarantee prices, loans at most favourable conditions, guaranteed outside work at fixed wages in addition to agricultural activity, acreage premiums and still other forms

A general view from Rush Pina, showing Mt. Herman in the background

of assistance. Usually a five-year period is needed until settlements can dispense with special help.

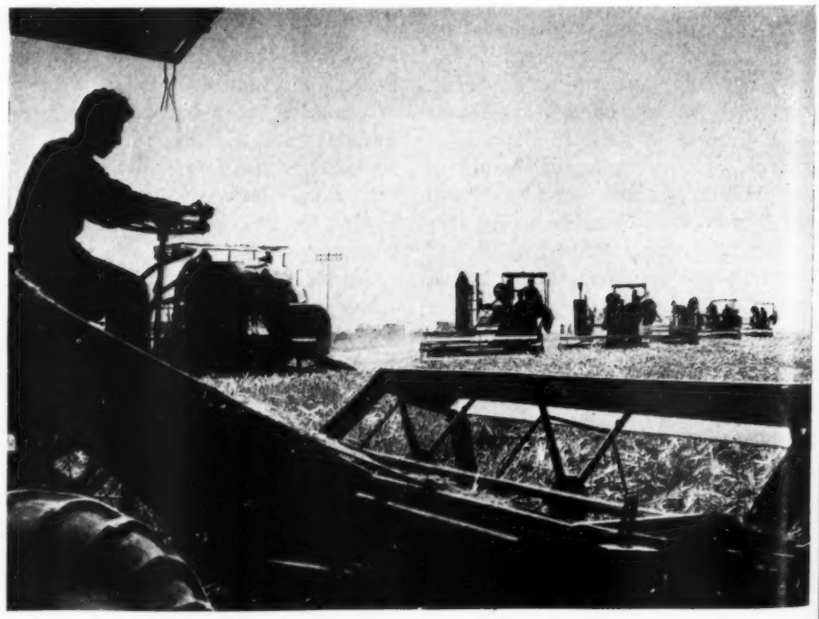
Special measures in the field of price formation. — The Government has offered to purchase all wheat at a fixed price and on request to offer instead of money a certain quantity of feed grains. It has fixed guarantee prices for milk, including a substantial subsidy to producers. It has guaranteed egg prices as far as purchasing by the marketing co-operatives is covering the supply for egg distribution. In fact, this scheme has provided the basis in which free market sales complement the ration. The Government participates in a price equalisation fund for vegetables, which are otherwise financed by the producers themselves. It also guarantees prices for exports (excluding citrus) if on the foreign market prices below a certain minimum are being paid. The Government has, however, so far not granted, on any substantial scale, consumer subsidies in order to broaden the market for certain local farm products, but has reduced the prices of standard bread, margarine and cooking fats, certain kinds of fish and of meat for rations, and of sugar. Subsidisation of milk for priority groups is under consideration. So-called development loans are given for the expansion of new farm branches, *e.g.* for peanut production, sugar-beet or cotton. Acreage premium facilitates production in difficult districts, like the Negev.

Bottlenecks in increasing production

In the main, the time needed for fully attaining optimum production for both local markets and for exports depends on the availability of additional water resources and of additional labour. Although the establishment of new farms and new settlements, land preparation, and notably the opening up of additional water resources, requires very large investments, this money will be found for agricultural development, if it is otherwise assured, and market analyses have shown reasonable prices for the additional output. Water and water-based electricity will be available in adequate quantities, particularly if a solution is found for the international issue on the Jordan water distribution. Otherwise certain limitations in supply are likely to be felt in some years' time.

The labour supply may prove the most difficult problem. There is no doubt that the natural surplus in labour force in agricultural settlements will not suffice for its desired increase. In addition, urban youth must be attracted, as well as immigrants; and even transfer of workers from urban to farm professions will be needed. All this means that training and extension will prove most important, together with a standard of life equal to those in cities, and, moreover, safeguarded against unemployment.

The necessity for a comprehensive scheme of training has been recognised and it is promoted in many ways. But new schools, training centres and the like cannot be established in a great number within a few years. First, future teachers must be trained. Besides, budgets are of necessity limited and organisation of all these activities takes time.



Modern machinery in the Negev, where only recently camels were accustomed to wander

In this field, particularly, a great measure of technical assistance has been provided by FAO and U.S.O.M facilitating the realisation of targets already laid down.

Agriculture within national economy

(*a*) At present the total farm population is only roughly 15%. But these 15% draw scarcely more than 70% of their income from agriculture. There is much additional income needed for young settlements. The target for the farm population is between 20% and 25%. This population should draw 80% to 85% of all its income from agriculture. In absolute figures, and within an increasing population, the doubling of farm population constitutes the goal to be obtained in six to eight years.

(*b*) It is being assumed, on the basis of all available material, that consumers will have to use about 50% of their expendable income for buying food, drink and tobacco. This figure shows clearly the outstanding role of agriculture in the general economy if 70% is spent on locally produced food. In addition, agricultural exports will form a large share of total exports. Citrus plantations may provide 12 million boxes against roughly eight millions at present, whereas from diversified farming perhaps 15% of overall output (excluding fodder) may prove exportable. Altogether exports from farming may total $60–70 million in a period of between five to 10 years, as compared with a total production value (fodder again excluded) of $225 million.

(*c*) Agricultural exports will probably be more than double the value of imports of food and correspondingly contribute substantially to cover the costs of other imports, be it oil or industrial raw material unavailable in the country.

(*d*) A sound and broad agriculture will greatly contribute to the wealth and security of the country, although Israel will remain predominantly urban. As stated above, there is no likelihood that more than a quarter of the population will live directly from the land. But this is already a high percentage, as in many progressive countries where farm technique is high, relatively few farmers provide a large share of consumers' requirements and substantial surpluses for exports.

Photos: Israel Embassy, London

Technical News

Building Materials for January contains articles on ' Salt Glaze Ware for Drainage ', by J. Lees, O.B.E.; and ' Fibre Board for Thermal Insulation '.

The January issue of *Dairy Engineering* contains an article on ' The Dairy Industry in Israel ' by Jacob Babad and Martin Guttfeld.

Food Manufacture for January includes ' The Vacuum Contact-Plate Method of Fruit Dehydration ' by Alan E. Joyce; ' Recent Advances in Starch Chemistry and Manufacture—II ' by Eric F. W. Dux, PH.D., M.SC., A.R.I.C.; ' The Touch of the Dutch: A Food Technologist Visits the Netherlands ' by James D. Devey, B.SC.; and Italian Food Engineering.

Articles included in the January issue of *Chemical Engineering* are ' Maintenance Problems with Mechanical-Draught-Cooling Towers—II ' by D. J. Tow, B.SC.(ENG.), DIP.CHEM.ENG.; and ' Sulphuric Acid Plant at Whitehaven '.

Walnut Cultivation in Poland

Writing in the September 1955 issue of *Problemy* (Warsaw), Prof. Pieniazek, Director of the Institute of Fruit-Growing at Skierniewici, describes the problems that have been met with in Poland in the cultivation of the walnut and the success of recent experiments in overcoming these difficulties.

At present the walnut tree is comparatively rare in Poland and the nuts are imported every year from abroad for the home market. The fact that up to the present the trees have been entirely propagated from seed has made it impossible to develop varieties of walnut and the cultivation of the tree has been an uncertain business.

The immense superiority of trees grown from grafts has, of course, long been recognised in Poland, but, unfortunately, attempts to take grafts have up till recently resulted in failure, though this has been tried by thousands of amateurs and many scientific workers. The reason appears to lie in the cool and changeable climate. The only hope, therefore, was to grow the grafts under glass in nurseries, but both pre- and post-war experiments in this direction had poor results, with only 10–20% of the grafts taking.

In 1951 Prof. Pieniazek spent two weeks in Hungary visiting the well-known Prof. Porpaczy, who has developed many new types of fruit trees. Prof. Porpaczy's success in raising walnut grafts under glass led to a more extended study visit to his experimental station by a member of Prof. Pieniazek's staff in 1953.

Two years later the Skierniewici Institute obtained its first good results from growing walnut grafts under glass. In a sample of several thousands the average rate of successful taking of the grafts was 70%, rising in some blocks to over 85%.

The results so obtained form the basis for commercial production of walnuts. What remains now is the choice of the best sites, with fertile soil and sheltered from frost. There is already a good choice of fine walnut trees from which to develop new varieties. This was recognised even before the first world war by Paul Crath, of Toronto, who took to America several valuable Polish walnut trees, from which he developed varieties which are today widely spread over the north-east of the U.S.A. and the southern provinces of Canada, where they are known as Polish or Carpathian walnuts.

There is thus the prospect of crops of walnuts that will play an important part in Poland's food production. Besides the dried kernels, there is the less well-known fact that fresh walnuts are an important source of vitamin C.

The Institute of Fruit-Growing has evolved a method of preparing a walnut syrup; this involves boiling apple syrup with freshly cut, newly picked walnuts, including the skin. Sugar is added and the mixture boiled until it will set when put on to a cold plate. The syrup has an unusual slightly bitter but not unattractive taste. Its quality is stated by Dr. F. N. Howes, of Kew Gardens, to be very high, being twice as rich in vitamin C as orange juice. Two teaspoons of the syrup supply the whole daily requirement of vitamin C.

The Smithfield Show and Agricultural Machinery Exhibition

THE 1955 Smithfield Show opened on Monday, 5 December, 1955, and continued until Friday, 9 December, 1955. This year the Show made a greater impact than ever before on the agriculturist and the layman. It is always surprising that Londoners and visitors from other great towns support this Show as they do and we suspect that there is still a great love of the land lurking in the breast of the office worker and housewife. The Show attracted many overseas visitors again this year, for its appeal is not by any means limited to Great Britain. The number of visitors from overseas was 1,570; many of them were buyers of both foundation stock, for the Show is still renowned for its livestock exhibits, and agricultural machinery and equipment.

About two-thirds of the 260,000 sq. ft. of exhibition space was taken up by an extensive display of the best in mechanical farming, the balance being reserved for livestock. The machines were mostly of British manufacture, but there were several machines manufactured overseas.

There is no doubt that the small- and medium-powered tractors created the greatest interest, and among these must be mentioned the David Brown 2D and the International Harvester ' Little Giant '. They received more than a fair share of attention from the visitors.

We give below an account of some of the more striking features of the Machinery and Equipment Section.

John Allen & Sons (Oxford) Ltd., Cowley, Oxford: Exhibited the Allen self-propelled motor scythe and the Allen garden sweeper. Both of these are claimed to be efficient and reliable.

E. Allman & Co. Ltd., Birdham Road, Chichester, Sussex: Exhibited spraying machinery for ground crops and fruit, sheep spray-race, piston pumps, rollervane pumps, tractor speedometers, portable fire-fighting equipment for estates and forestry, new lightweight hand duster, fertiliser placement drill for front mounting to tractors and fuel-tank filters.

New equipment included Allman Model ' 60 ', an entirely new field sprayer, comprising a pressed-steel universal frame, ' Genimec ' control system, 60-gal.-capacity circular tank with controlled agitation, rollervane pump, safety booms—spraying width 218 in., height under booms adjustable from 15 to 46 in.—four-stage filtration, booms parked firmly for transport.

Automotive Products Co. Ltd., Leamington Spa, Warwickshire: Components for tractors and agricultural machinery were shown. A new Lockheed-Avery breakaway coupling, which is a twin unit connecting both pressure and return lines between the tractor and the implement, consisting of four self-sealing coupling halves mounted on frames and held in a coupled position by a mechanical latch. It eliminates the breaking of hose lines and the consequent loss of fluid, and is simple to use.

Alvan Blanch Development Co. Ltd., Chelworth, near Malmesbury, Wiltshire: Exhibited two complete grain driers. Other implements included grain conveyors, grain elevators and a ' Spirolift '.

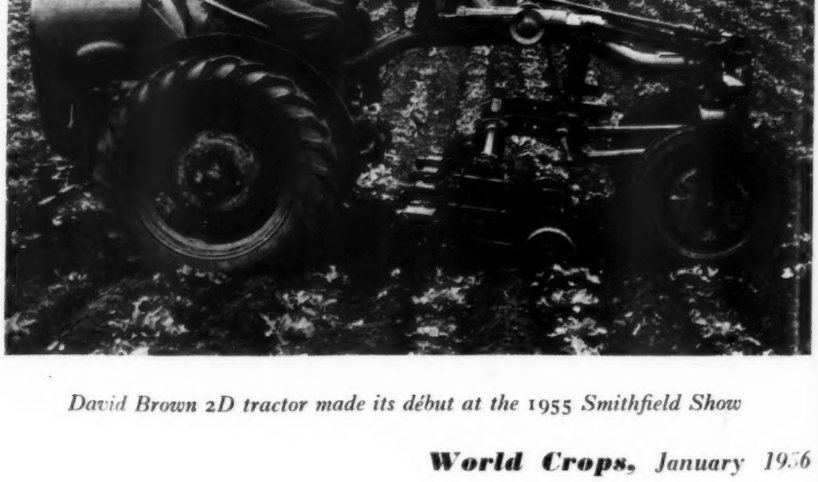
New equipment included an automatic sack weigher, which can be supplied with or without a stand, and for the one-combine farm the exhibitors have released the Alvan Blanch Junior ' Cascade ' drier. The last machine is supplied in one piece.

Atcost Ltd., Paddock Wood, Kent: The Atcost stand consisted of photographs and models of their precast reinforced concrete buildings. The range includes implement sheds, covered yards and barns.

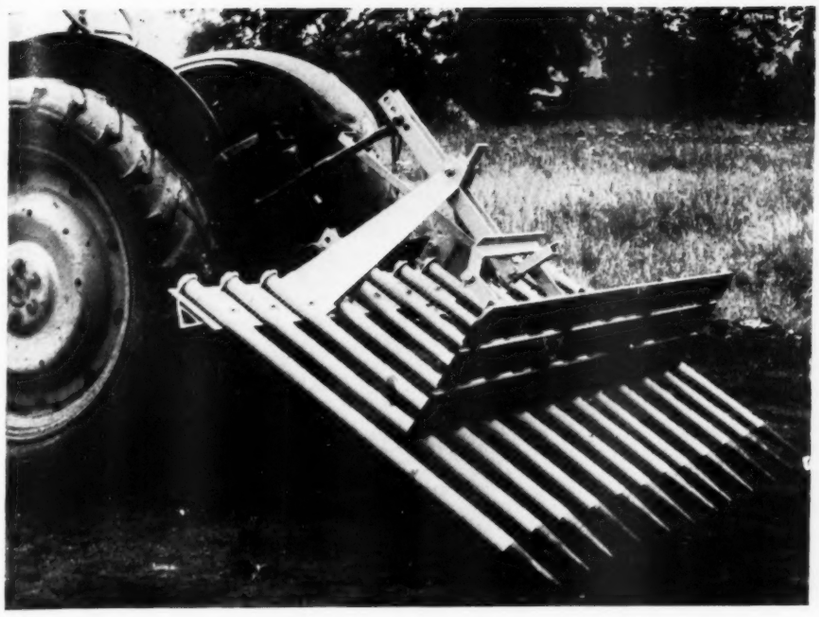
Atkinson's Agricultural Appliances Ltd., Enterprise Works, Kendal Street, Clitheroe, Lancs.: The machines shown included power-driven spreaders suitable for farmyard manure, lime and fertilisers.

A new addition to the Atkinson range is the ' Renown ' power-driven spreader. It is a smaller version of the ' Universal '. A rubber conveyor belt is fitted to the ' Renown '. The manure is loaded on to the belt and is carried towards the tine shafts, which in turn disintegrate the manure before it passes to the impellers for distribution. The impellers are so placed that no farmyard manure, however thin, can pass without contact, thus ensuring that all the manure is efficiently spread.

Automobile Palace Ltd., Llandrindod Wells, Radnorshire: ' Dania ' farm machinery, manufactured by **Dronningborg Maskinfabrik A S,** Randersm, Denmark, was shown by the Automobile Palace Ltd. Equipment



David Brown 2D tractor made its début at the 1955 Smithfield Show



'Somerset' 12-tine buckrake (Denings of Chard Ltd.). The photograph shows the prototype model; production will commence early in 1956

included the 'Dania' Model 3C double-cleaner threshing machine (with 18-in. drum), supplied with large feeding table and chaff blower as standard equipment. Also shown was the 'Dania' grain pre-cleaner. Apart from cleaning, the grain, with this machine, is graded by weight into first, second and third, and an awner is included for husking barley and trimming other species. The maximum height of the machine is only 8 ft. 6 in. and a low hopper makes filling easy.

J. C. Bamford, Rocester, Uttoxeter, Staffs: Exhibited the 'J.C.B.' excavator, 'Major' loader and half-track for the first time. The excavator is used where the larger types would be prohibitive because of cost, *e.g.* trenches, house footings, sewers and site clearance. The loader carries a $\frac{5}{8}$-cu.-yd. bucket, which can tip from 1 ft. 6 in. to 8 ft. under lip, and can be used with a bulldozer for site clearing and back filling trenches. The half-track converts most tractors into ideal machines for bad conditions and has the novel feature of being detachable in two minutes.

Wm. Ball & Son Ltd., Royal Implement Works, Rothwell, Northamptonshire: Exhibited for the first time was a new two-wheel hydraulic tipping trailer, with an all-steel chassis, mounted on pneumatic wheels and roller-bearing hubs. It had a 15-in. fixed front board and hinged side and tailboards made of hardwood; it was fitted with a pipeline and non-spill coupling to connect to tractor.

Barford Agricultural Ltd., Syston Lane, Belton, near Grantham, Lincs: A range of dairy and farm food-cooking equipment was shown. In addition, the 'Atom-15' multi-purpose two-wheeled tractor (for those with hoeing problems) and the Barford power scythe were on show.

A new electric steam boiler was shown: it can be supplied with 7.5-, 15-, 22.5- or 30-kW. loading elements, which enter the boiler through its side, thus facilitating simple removal for periodical inspection. Provision is made for heating water under thermostatic control, and an automatic cut-out is fitted to protect the elements.

Belfast Ropework Co. Ltd., Belfast: A representative selection of ropes, cords, lines and twines manufactured from natural and synthetic fibres was displayed. Of interest to agricultural visitors were 'Bluebell' binder twine and 'Super Bluebell' baler twine.

A. B. Blanch & Co. Ltd., Crudwell, Malmesbury, Wiltshire: Among the exhibits shown by this firm were the Blanch combine harvester, the Blanch/Lely Mark V 'Revolution' side-delivery rake, elevators, fertiliser broadcasters and hedge cutters.

An entirely new machine, the Blanch/Lely side-rake and swath-turner 'Folder', was shown for the first time. It is a trailing-type implement mounted on two or three rubber road wheels. The four tine wheels will span up to two 5-ft. swaths for either side-delivery raking or swath turning.

Bomford Bros. Ltd., Pitchill, near Evesham: Most interest centred on their range of hedge cutters. The 'Hedgemaker' and 'Hedgemaker Minor' were both on show on different makes of tractors.

A new product, the 1956 front-mounted 'Any Angle Mower', is of interest to large-scale farmers. It offers a high-quality mower with a range of duties much wider than the mowing of meadows.

T. T. Boughton & Sons Ltd., of Amersham Common, Bucks: Displayed two new models of tractor winches.

One is the front-mounted winch. It is particularly suitable for self-recovery purposes when the tractor becomes stuck in mud and snow. The fitting of this winch in no way hampers the use of ancillary equipment usually fitted to the rear of the tractor. By means of rope guides fitted to the underside of the tractor, the winch can also be used for rear towing.

The primary drive is taken from the belt-pulley position by Renolds duplex chain and is fully guarded. An internal ring gear and pinion, permanently meshed and totally enclosed, provide the final drive. The pinion is mounted on opposed Timken taper bearings. The steel winding drum also runs on opposed Timkens. Oil seals prevent oil leakage and exclude dirt and moisture. It includes a totally enclosed 12-in.-dia. brake and line pull is up to five tons.

The second new item is a small all-steel winch of revolutionary design, giving line pulls of up to five tons. Suitable for all makes of wheeled tractors, this winch will enable the three-point linkage to remain in position.

British Electrical Development Association, 2 Savoy Hill, London, W.C.2: The stand was devoted to the uses of electricity for grain drying and the economic production of high-protein winter feed.

A multi-purpose crop drier, basically for drying grain in sacks, and used

out of season for the drying of wilted grass, was shown.

In-silo and platform grain-drying equipment was exhibited, together with moisture meters. Drying by cold-blow method was represented by display treatment and suitable equipment. Other electrical methods for grain and grass drying were also depicted.

British Ropes Ltd., Doncaster, Yorks: Exhibited 'Red Star' baler and binder twines. This twine is divided into four grades—extra fine, fine, medium and heavy. A wide range of agricultural ropes, such as halters, cart rope and calving ropes, were also on view. These are supplied made of sisal or nylon.

David Brown Tractors (Engineering) Ltd., Meltham, near Huddersfield, Yorks: The main David Brown exhibit at the Show was a revolutionary small tractor which has a low initial cost, is claimed to be economical in fuel consumption and to be versatile and efficient.

Virtually a mobile toolbar, the David Brown 2D, as the machine is called, has an air-cooled, twin-cylinder diesel engine, which is rear-mounted, with a four-speed gearbox giving forward speeds from 1 to 8 m.p.h. The engine is very economical with a fuel consumption of less than $\frac{1}{4}$ gal. per hour.

Unconventional in appearance and design, the 2D is the first in the world to be equipped with a pneumatic system of implement control. A small built-in air compressor provides an inexhaustible source of power, which is available at the touch of a lever to assist in raising and lowering the implements. The main frame of the tractor is used as a compressed-air reservoir.

All the specially designed tools are underslung so as to be entirely within the driver's vision, enabling even the unskilled operator to work to extremely close limits when rowcropping. Most of the tools are carried on a mid-mounted common toolbar. This has enabled the manufacturers to offer basic tillage implements at a fraction of the cost of conventional rear-mounted equipment. The tractor and ancillary equipment will normally be sold in five main packs, each designed to suit particular types of farm.

C.A.V. Ltd., Acton London: A representative selection of diesel fuel-injection equipment and electrical equipment for agricultural tractors and for stationary and portable engines was shown.

The new C.A.V. Type 'F' paper element fuel-oil filter for diesel engines was shown. It represents an advance in fuel filtration and will greatly assist diesel users who operate tractors and machinery in dusty conditions in reducing the cost of pump maintenance caused by wear.

Caterpillar Tractor Co., Peoria, Ill., U.S.A.: Shown by the U.K. Caterpillar dealers was the first of the new Caterpillar No. 933 'Traxcavator' material handlers to be shown in the U.K. Also on the Caterpillar dealers' stand was the No. 42 dual-purpose toolbar for Caterpillar tractors.

J. W. Chafer Ltd., Milethorne Lane, Doncaster, Yorks: Chafer's Q.F. sprayers, 150- and 250-gal. capacity, are designed as universal machines and can be used for spraying most types of chemicals and can be successfully operated by the farmer's own men. The engine-driven pump of the 150 has been specially designed by the manufacturers after many years of testing on their own contract spraying. The pump of the 250-gal. model is driven by the p.t.-o. of the tractor. The tanks are lined to resist corrosion; vertical folding booms are supplied on these machines. The 150-gal.-size booms are 25 ft. wide with height adjustment from 1 ft. 6 in. to 4 ft. 6 in. The track is also adjustable from 56 in. to 64 in., with ground clearance more than that of standard rowcrop tractors. The large-size tyres ensure the minimum of ground pressure; the 250 size is very similar, but proportionately larger. All parts are corrosion-resisting; three filters make for trouble-free spraying; stirring is accomplished hydraulically on the 150 and mechanically on the 250. The sprayers are self-filling; special pipes can be fitted, including potato underleaf down pipes. A gauge is fitted which shows the contents of the tank and there are many other practical fittings, such as anti-drip nozzles.

Cooch & Sons Ltd., Commercial Street, Northampton: Complete plants for brushing, washing, drying, sorting and hand picking potatoes, vegetable washers, corn- and seed-winnowing machines.

A new potato drier (exhibited for the first time at the Royal Show, Nottingham, 1955) consists of a series of rotating sponge-covered rollers over which the wet potatoes are passed. The moisture absorbed is squeezed out by spring-loaded steel rollers pressing up against the underside of the sponge-covered rollers. It is used with the standard vegetable washer.

Cooper, Pegler & Co. Ltd., P.O. Box 9-307, Burgess Hill, Sussex: The full range of knapsack sprayers, dusters, small- and large-power machines was exhibited. The 'Eclair' knapsack sprayer is now fitted with a crank for right- or left-hand pumping as desired. The outlet has been altered so that the spray lance can be held in either hand. A new easy fitting, liquid-tight lid is incorporated. The powerful twin-

The Dorman 250-gal. high/low-volume trailer sprayer

piston ' BX ' spraying groups, having outputs from 210–525 gal./h. at pressures up to 425 lb./sq. in., are now available mounted on a strong four-wheel chassis.

Cruikshank & Co. Ltd., Denny Iron Works, Denny, Scotland: The implements shown included the Denny two-furrow mounted plough with 14-in. swivel disk coulters, a linkage side adjuster and the ' Sorite ' grass-seed broadcaster and fertiliser. A selection of cast-iron, malleable and steel castings as supplied to the implement trade were also on show.

E. O. Culverwell Ltd., Malling Works, Lewes, Sussex: Among the implements shown were manure turners, potato planters, sack lifters and hay sweeps.

Dennings of Chard Ltd., Chard, Somerset: A comprehensive range of implements was on show. The ' Somerset ' 12-row grain and fertiliser drill, which was first exhibited at the 1955 Royal Show, is available with disk, hoe or suffolk coulters. Other features are large-capacity hoppers, steel wheels with wide wheel bonds, and availability as either a grain only or combined model.

Other equipment in the ' Somerset ' range included a side-delivery rake and swath turner, a 5-ft. semi-mounted mower, a double-action haymaker, potato spinner and a 7-ft. 6-in. tandem disk harrow.

The ' Somerset ' 12-tine buckrake was shown for the first time. A push-off board is fitted to enable loads to be deposited exactly where required on any type of silage pit or heap. Attachments are available for fitting to the Fordson Major, Ferguson, David Brown and Nuffield tractors.

P. W. Dilloway Ltd., The Green, Southall, Middlesex: Showed the reconditioning of worn crawler-tractor and excavator parts by building up with welding and machining to the correct contours. Gears, shafts, buckets and grabs are also rebuilt to correct standards.

The dismantling and reassembling department specialises in the fitting of bushes and complete assemblies of track lower rollers, and has a fully efficient machine shop manufacturing and machining shafts, bushes and various other components which go to make up the complete units.

The ' Weedmaster 60 ' (Fisons Pest Control Ltd.) being tested on rough ground near Cambridge

Dorman Sprayer Co. Ltd., Ditton Walk, Cambridge: In a complete range of spraying equipment the newly introduced 100-gal. high/low-volume sprayer was exceptional. This machine is a smaller inexpensive version of the Dorman 150-gal. sprayers. Although retaining all the features and characteristics of the larger sprayers, it has been designed for the farmer requiring both high- and low-volume applications, but on a limited acreage. Also shown for the first time was the Dorman distributor. It is designed as a tractor-mounted machine, using the same chassis that mounts the Dorman 40- or 60-gal. mounted sprayers. It can be bolted in position in a matter of minutes.

An outstanding new development was the ' Swan ' nozzle; it gives a complete 30-ft.-wide spray.

Dowty Group Ltd., Cheltenham: A range of gear-type hydraulic pumps, hydraulic rams, self-sealing couplings and control valves was displayed.

Dunlop Rubber Co. Ltd., Hastings House, 10 Norfolk Street, London: Among the wide range of tyres displayed was the ' Fieldmaster ' open T-pattern rear tractor tyre. A large range of land/road and ribbed implement tyres for a wide variety of applications, such as combines, balers, threshers, elevators, reapers and binders, was also displayed. Other exhibits included wheel units, axle undergear, high-pressure hose, and a full range of agricultural rubber boots.

Easiwork Ltd., Gillingham, Kent: Easiwork health cookers, which are used for processing food for pigs and poultry, were on display.

Enfield Industrial Engines Ltd., Redditch, Worcs: This company exhibited Enfield ' 85 ' and ' 100 ' lightweight air-cooled single- and twin-cylinder diesel engines of 568-c.c. to 1,570-c.c. capacity for traction and a variety of stationary applications in the agricultural field.

English Numbering Machines Ltd., 25 Queensway, Enfield, Middlesex: Amongst a comprehensive range of time recorders for various uses in agriculture was a new unit, the ' Acremeter ', which is designed for installation on seed drills, combines etc. to give an accurate and direct indication of the acreage worked.

Farm Machinery & Accessories Ltd., Holne Cross, Ashburton, Devon: Exhibited were the ' Viking ' universal mounted mower and the ' Viking ' ST67 self-propelled combine. The combine has an output of 5–6 tons per hour.

Featherstone Agricultural Ltd., Durham Road, Boreham Wood, Herts: The implements shown included mid-mounted mowers for popular tractors —cutter bars available from 2 ft. 6 in. to 7 ft.—fitted with either 1½-in. or 3-in. fingers. A breakaway and declutching device with automatic re-

setting was also on display. Attachment brackets for using the mower in conjunction with the Patterson buck-rake were available.

Firestone & Rubber Co. Ltd., Brentford, Middlesex: A complete range of agricultural tyres was on display. The Firestone horticultural tyres are of open-centre pattern; they are self-cleaning and give maximum traction under all ground conditions.

J. A. Fishleigh & Son Ltd., North Fordlands, Northam, Bideford, Devon: Shown for the first time was a 5-ft. trailer-model rotary cultivator. It incorporates wheels in front of the rotating cultivator, thus eliminating the wheel marks of both tractor and cultivator.

Fisons Pest Control Ltd., Bourn, Cambs: Fisons were showing many new machines, the most interesting of which was the ' Fieldmaster ' 150-gal. trailer machine. This is a trailer-type, medium-pressure, high/low-volume spraying machine. The 150-gal. tank is carried on a sturdy chassis and is equipped with a mechanically driven agitator. The p.t.-o.-driven ' Arun ' pump delivers 15 gal. per min. at 150 lb. per sq. in. The machine is equipped with three-stage filtration and has adjustable track width for row-crop work. Supplied with crop spraybars, interchangeable nozzles give an application rate of 5–80 gal. per acre at 4 m.p.h. Special equipment for spraying hops, vineyards and potatoes is available. Handlance equipment can also be supplied.

R. J. Fleming (Stony Stratford) Ltd., 17 High Street, Stony Stratford, Wolverton, Bucks: A hedgecutter and scrub clearers for mounting on fore- and rear-end loaders and the ' Lightning ' hedgecutter, utilising a 42-in. saw, for attachment to Fordson tractors were on display.

Also shown was the ' R. J. Fleming ' hedgecutter with a saw head that can be angled within 220°. All machines are one-man operated.

Ford Motor Co. Ltd., Dagenham, Essex: On display were four Fordson Major diesels, which comprised one export and three domestic models. The export tractor was the roadless tricycle conversion with 96-in. extending rear axles. It incorporates an automatic clutch release and decompressor.

Among the Ford-Ransomes implements were mounted toolbars and one-, three- and four-furrow ploughs. An important innovation was the ' Proofmeter '. This device is virtually eight meters in one, giving information of hours worked (for injector and general maintenance), engine revolutions (for economy of running and the synchronisation of belt- and p.t.-o.-driven implements) and land speed in m.p.h.

The ' R. J. Fleming ' hedgecutter. Engines up to 10 h.p. can be used, according to the size of the saw

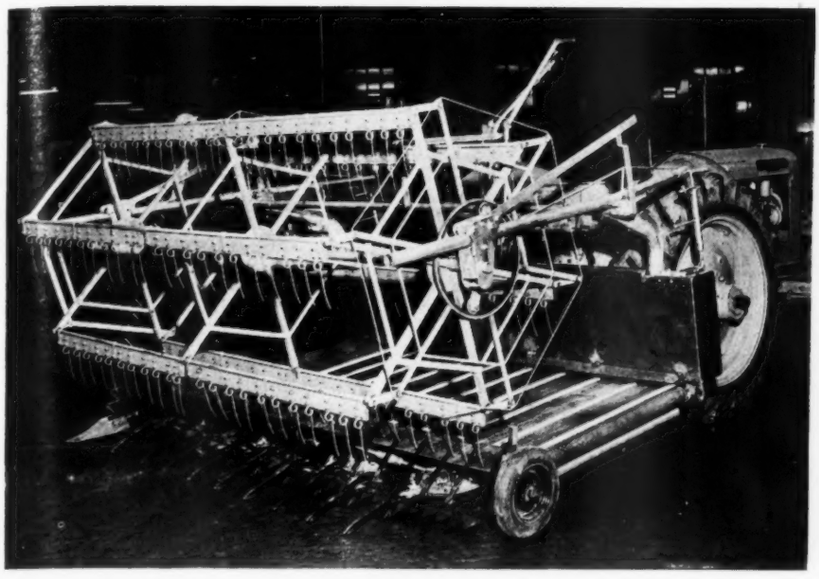
Four Oaks Spraying Machine Co. Ltd., Four Oaks, near Birmingham: A range of spraying equipment was on display; of particular interest was the new Model 333. This is the smallest of the Four Oaks range, but is similar in construction to their 60-gal. machine. Fitted with a ½-in. pump, it has a 40-gal., heavy gauge, galvanised and painted tank; 16-ft. booms give a spray width of 17–18 ft. The booms are adjustable for height and swing back if obstructed, returning to the correct position after clearing the obstruction. The booms can be raised or lowered individually from the driver's seat. Four sets of nozzle tips are available, giving 5, 10, 15 and 20 gal. per acre at 4 m.p.h.

R. J. Fullwood & Bland Ltd., Fullwood House, Ellesmore, Salop: Milking machines of all types were on display, including the Track Recorder which was awarded a Silver Medal at the 1953 Royal Show. Included in the display were electric fencer units and refrigerated milk coolers. Exhibited for the first time was the ' Fullwood ' rubber-bodied wash trough. The body is made of a rubber-resin compound, is extremely tough and is unaffected by corrosive factors of either acids or alkalis normally used in washing dairy utensils. The body, being soft and flexible, does not damage the utensils, glass milk bottles etc.

H. Cameron Gardner Ltd., Woodley Aerodrome, Reading, Berks: The new ' Rearloda ' machines were on show; these are available for the Fordson Major, Nuffield, Ferguson and David Brown 25 and 30 tractors. The loaders can be used for manures, root crops etc. They are suited to farm use because they can be fitted rapidly and the weight is carried over the tractor driving wheels.

Geest Industries Ltd., Spalding, Lincs: Exhibits included barrows (single and twin wheeled), churn carriers, hand trucks (two, three and four wheels), the new Mark 3 pig-weighing machine and the new 3-h.p. motor tipper-truck.

General Electric Co. Ltd., Magnet House, Kingsway, London, W.C.2: On the G.E.C. stand a selection of their crop - drying equipment was shown; this included the recently introduced multi-purpose crop drier for grain, wilted grass, lucerne etc. A



This rear-mounted pea-cutter and swather (H. Leverton & Co. Ltd.) will fit most tractors with three-point linkage

new exhibit was a special lighting fitting for potato-chitting houses, which consists of two fluorescent tubes mounted end to end. The fitting can be hung vertically between stacks of storage trays from overhead conduit, and the light emitted from the Osram new warm white tubes encourages the growth of short sturdy roots. The fittings can be used either in glass or brick houses, and two versions are available—one with two 5-ft., 80-W. tubes and the other with two 4-ft., 40-W. tubes.

Glenaldie Woodworking & Engineering Co. Ltd., Haseley Iron Works, Great Haseley, Oxford: A new machine, the 'Teddervent', was shown.

The Hayter 6-ft. p.t.-o.-model grass cutter. It will also cut blackberry bushes, thistles, docks etc.

Designed as a normal tedder for both hay and straw, and for use in conjunction with a mid-mounted mower, it raises the last swath cut and at the same time combs it out, thereby allowing the air and wind to filter freely through the whole swath. In wet weather a swath treated by this machine will be found to dry out very quickly. Other exhibits included the ' Jarmain ' combined side-delivery rake and swath turner, a light-tractor hay sweep, sack holder and combined sack holder and truck.

Thomas Green & Son Ltd., Agricultural Division, Smithfield Iron Works, Leeds 2: A range of Bean ' implements was on display. The ' Bean ' down-the-row thinner was shown for the first time. It has been designed primarily as an attachment for the ' Bean ' multibar (steerage hoe). The thinner unit can be fitted in multiples according to the number of rows being worked. The standard thinning rotor is fitted with eight tines, but this can be implemented with 12 or 16 tines, according to the plant population. The rotating action is derived from a straked land-wheel drive and each complete unit can be fitted to the multibar in a few minutes without the use of spanners.

Gush & Dent Ltd., Alresford, Hants: Tubular-steel farm and dairy equipment was on display. A new item was the pig-ringing crate. This consists of a tubular-steel frame with 2-in. weldmesh, a quickly operated yoke and adjustable rear flap. It has a heavy timber floor. The overall dimensions are: length 5 ft. 4 in., width 1 ft. 8 in. and height 3 ft. 3 in.; total weight is 126 lb.

Hart Agricultural Engineering Co. Ltd., Grosvenor Street West, Birmingham 16: On show were two tractor-mounted crop sprayers, *i.e.* a 40-gal. junior model giving 19-ft. 6-in. spray and the 60-gal. senior model giving a 21-ft. spray. These machines are low/medium-volume types. The 60-gal. crop sprayer is fitted as standard with copper spraying tubes and non-ferrous valves etc. throughout.

Hayters Ltd., Spellbrook, Bishop's Stortford, Herts: Hayter rotary grass cutters are made in various cutting widths and are intended for use in orchards, parks, plantations, aerodromes, farms etc. The machines are efficient, even in adverse weather conditions, and will cut heather, blackberry bushes, docks and every other weed.

The 6-ft. p.t.-o. model grass cutter is suitable for use with all medium- and high-powered tractors fitted with a rear p.t.-o. shaft. The cutting height is adjustable from ground level up to 6 in. by means of a ratchet and lever situated at the rear of the machine. The drive is taken from the tractor p.t.-o. shaft through a telescopic shaft with needle bearing joints and by heavy V-belts to the cutter heads. It is mounted on four 14-in. × 3-in. ball-bearing wheels, with solid rubber tyres, and is very strongly constructed for heavy and continuous work.

Hepworth & Grandage Ltd., St. John's Works, Bradford 4: A range of ' Hepolite ' products was on display; these had application to agricultural and horticultural machinery. The range included pistons (alloy and cast iron), cylinder liners, piston rings, packaged ring sets, gudgeon pins and valve-seat inserts. The ' Vacrom ' chromium compression ring, ' Hepoflex ' oil-control ring and ' Oilmaster ' ring set were featured on special displays.

Kenneth Hudson & Son, Agricultural Engineers, P.O. Box 10, Darlaston: The range of implements exhibited included two- and three-disk ploughs. Developed especially for tough conditions, the adjustments have been kept to a minimum to ensure that

The Massey-Harris '728 Super Seeder'. There are 16 seed rates and 100 settings for the fertiliser feed

the plough is simple to operate. The carbon-steel disks are bolted to a forged one-piece axle and run on a thoroughly sealed bearing. A strong coil spring ensures that the rear wheel bites into the furrow and keeps the plough straight.

International Harvester Co. of Great Britain Ltd., Harvester House, 259 City Road, London, E.C.1: The most important exhibit at the International Harvester stand was their new medium-powered tractor. The most interesting features on the new B-250 tractor were:

The incorporation of Lambert disk brakes.—They are positive in reverse or forward motion, self-energising and require little foot pressure.

The differential lock designed to overcome one-wheel slip.—By pressing a heel pedal the rear axles become in effect one axle, thus both wheels revolve evenly and the tractor continues to drive forward instead of eventually burying a wheel.

A reversible link system.—This enables the B-250 to be fitted with both categories of mounted implements. If an implement fits a three-point linkage, it will fit the standard B-250—one end or the other of the links. A change, which takes only a minute or two to effect, alters the links to the other category.

Another important point is that the bonnet and radiator grille can be pivoted forward to disclose the entire engine, radiator, air cleaner and batteries.

The engine is a 30-b.h.p. diesel engine, designed and manufactured by International Harvester. It is a four-cylinder, valve-in-head unit with a swept volume of 144 cu. in. At rated governed speed of 1,750 r.p.m. it gives the tractor 28 belt h.p. and 25 drawbar h.p. (estimated). The compression ratio is high, 19 : 1, giving a smooth, easy start on full diesel.

The new Lister tractor-mounted sheep shearer. The equipment incorporates two shear heads driven by the tractor p.t.-o. via a simple gearbox

On display also were the International BTD-6 crawler tractor, diesel; McCormick International Super BWD-6 Standard, diesel, wheel tractor; McCormick International Farmall Super BMD; McCormick International Farmall SBM; and the McCormick International B-45 pick-up baler with diesel-engine drive. The baler requires only one operator and can be used with a medium-h.p. or small tractor. The bale size is 14 in. × 18 in. × 30 or 36 in. It can be easily adapted to bale green crops for silage.

Alexr. Jack & Sons Ltd., Maybole, Ayrshire: On display were the 'Triplex' three-row combined drill plough, the artificial manure distributor and dibbler, and the three-row manure distributor and dibbler attachment to suit various makes of toolbars. Spring-loaded single weeder units to fit various types of toolbars were also shown.

Johnson's (Engineering) Ltd., Elliott Road, March, Cambs.: The display included the 'Johnson' Junior potato harvester with an output of 2–3 acres per day, a mounted elevator digger for potatoes, carrots etc., a two-row potato planter and the 'Johnson' front-mounted haulm pulveriser. The haulm pulveriser is available in two- and three-row models; they can be attached to the three-point linkage of any tractor. Dividers are fitted to pick up the haulms and deliver them to the beaters.

Kent Engineering & Foundry Ltd., Phoenix Works, Tovil, Maidstone: Exhibited spraying equipment, of which the 'Motoblo' proved interesting. It is a shoulder-mounted, mechanically agitated dust blower, mist sprayer and fogger. The basic engine blower unit is quickly convertible to any of the above three systems. It comprises a small efficient air-cooled engine, producing a high-velocity air stream, which is the carrying medium, and it weighs 35 lb.

L. R. Knapp & Co. Ltd., Thames Valley Iron Works, Clanfield: Main products on show were all sizes of grain, seed and root drills, manure distributors and hay-loaders. All machines can be supplied with a three-point linkage. A new machine designed for accurate sowing of small quantities of granulated, concentrated fertiliser was shown. The machine has few

wearing parts and only two cogwheels; it can be stripped in a few minutes and cleaned for storage.

R. A. Lister & Co. Ltd., 15 Kingsway, London, W.C.2: The new tractor-mounted sheep shearing machine attracted attention as being of use to hill farmers. The shearer incorporates two shear heads driven from the tractor p.t.-o. *via* a simple gearbox; also a general-purpose elevator for bales or sacks and with attachments was shown; it will handle loose hay, potatoes or sugar-beet.

Loddon Engineering Co. Ltd., Loddon, Norfolk: The L.E.C.-Jucan 'Agrodisc' is designed to replace the existing disk coulter and skimmer. As the plough is drawn through the land the machine, by virtue of its design and position on the plough, rotates and turns all trash etc. into the bottom of the furrow and cleans itself at the same time. It reduces the draught of the plough and can be fitted in a few minutes.

E. C. Longmate Ltd., Terrington St. John, Wisbech, Cambs.: Particulars of a spraying contract service available in England were given at their stand and on exhibition was a low-volume sprayer, together with various types of sprays.

Joseph Lucas Ltd., Great King Street, Birmingham 19: A general range of Lucas ignition and electrical equipment for tractors and agricultural machinery was on display.

The new high-capacity 'King of the Road' battery, Model GU11E, embodies the latest Lucas developments in battery construction. It has 'linkless'-type connectors — this new method of inter-cell connection, apart from saving weight, offers a neater and cleaner appearance. The newly designed terminals give a positive, easily removable connection, free from the corrosion nuisance. The bared cable is passed through a tapered collet, which is pulled by a moulded, knurled screw into the taper of the burnt-on terminal. Filler caps are of the latest unspillable design. Originally designed to satisfy stringent police requirements, the battery has now been adopted for general use. There is a 12 months' guarantee with each of these 'electric fence' batteries.

Marshall Sons & Co. Ltd., Britannia Works, Gainsborough, England: The Marshall organisation featured a tractor with a Perkins L4 diesel developing 48 b.h.p. at 1,600 r.p.m. and a 12,000-lb. drawbar pull, six forward speeds from 1.31 m.p.h. to 5.15 m.p.h. and two reverse speeds. Also featured was a completely new diesel crawler tractor (**John Fowler & Co. Ltd.,** Leeds) equipped with a Leyland-type diesel engine developing 60 b.h.p. A combined steering clutch and brake-control unit dispenses with the need for steering brake foot pedals. The clutch is operated by a spring-loaded hand lever, located on the left-hand side, which can be dismantled without removing the engine. The six forward gears, the first four of which are directly reversible by an independent forward/reverse lever, all have a positive locking device.

Marsham Tyre Co. Ltd., 207 Oxford Street, London: Service equipment, including air compressors, sprayers, vulcanisers, welders and lubricating equipment for tractors, were on display.

Massey-Harris-Ferguson (Sales) Ltd., Coventry: Of major interest was the tractor which has just returned from the Antarctic expedition and it attracted a considerable amount of attention. Also on show were combines, harrows, a compressor with hedgecutter, heavy-duty spike-tooth harrows and a variety of other equipment.

Close-up of undersown wheat three weeks after spraying with 'Tropotox' (May & Baker Ltd.)

May & Baker Ltd., Dagenham, Essex: It is claimed that 'Tropotox', a recently established weedkiller, is entirely safe on all clovers whether direct-seeded or undersown in cereals, in leys or in pasture, and, if sprayed at the right time, controls a wide range of annual and perennial weeds, including the creeping thistle in the pea crop.

Mitchell, Colman & Co. Ltd., Hollybank Street, Radcliffe, Manchester: Noteworthy on their stand, which included many German machines, was the lightweight 'Handy-loader', a grain-handling machine, which in the smallest model weighs 35 lb.

Ch. J. Neuman Ltd., 445 Brighton Road, South Croydon, Surrey: The Mark 803 'Nubrex' lubricator introduced at last year's Show can now be converted into a filler pump by inserting a filler-valve adaptor between the handle body and hose assembly, a self-sealing filler nipple is also introduced for automatic loading and only one stroke of the handle is necessary to fill the gun.

New Holland Machine Co. Ltd., 7 Boston Manor Road, Brentford, Middlesex: Available in p.t.-o., T.V.O. - engine - driven and diesel - engine-driven forms was a British-

made Model 66 twine-tie pick-up baler. The machine is adaptable and can operate on all types of terrain. The price of this machine has recently been reduced.

W. N. Nicholson & Sons Ltd., Trent Iron Works, Newark, Notts: A combined side-delivery rake and swath turner for 5-ft. swaths, with a modified stripper board assembly, was shown, together with the 9.Z. and 10.Z. tedders, which, it is claimed, are the complete answer to mechanised hay-making, the grass being cured in 30 to 36 hours if there is no actual rainfall.

Nuffield Organisation, Cowley, Oxford: There was a varied display of tractors by Nuffields, diesel-, petrol-(export) and vaporising-oil-engined versions, equipped with both the normal and the tricycle-type wheel equipment. Altogether eight models were shown, together with a fully-sectioned revolving exhibit with an electrically driven engine.

Jack Olding & Co. Ltd., Hatfield, Herts: Included in their exhibit was the ' Angus ' potato digger, a strong and easily operated machine for lifting potatoes. Damage to the crop by bruising, it is claimed, is eliminated by the machine digging under the plants. Controlled vibration of the elevator screen enables the crop to be cleanly lifted; with ' earlies ' the screen can be set to cushion the crop. Any tractor fitted with a p.t.-o. is simple to adjust to the ' Angus '.

Opancol Ltd., 3 Sherwood Street, Piccadilly Circus, London: Shown in display form was the automatic humidity control for in-bin grain drying; it controls three banks of heaters, according to the relative humidity. The ' Silometer ', a dial-type stem thermometer, and the ' Quicktest ' grain-moisture tester were also exhibited.

Over Timber Co. (Fawsley) Ltd., Fawsley, Daventry: Introduced an all-weather cattle-feeding rack of new design. It has a metal roof and can be filled with bales of hay from both ends. The height is 6 ft. (adjustable), width 3 ft. 4 in. and the rack is detachable.

F. Perkins Ltd., Peterborough: On view were the Perkins P3 (TA) as fitted by Allis Chalmers to the Model B tractor, a three-cylinder unit with a bore of 3.5 in. and a stroke of 5 in. It is rated to develop 25 b.h.p. to 32 b.h.p. at speeds up to 2,000 r.p.m. The P4 (TA), a four-cylinder unit, which was offered at powers ranging from 29 to 43 b.h.p., and the P6 offered as a conversion unit for the heavier type of tractor. The power range of the P6 is 34 to 61 b.h.p. at speeds up to 2,000 r.p.m.

The New Holland Model 66 twine-tie pick-up baler. Several improvements have recently been incorporated

John Perks & Son (Forgings) Ltd., Lye, Stourbridge, Worcestershire: Apart from trailer brakes, prop screws, towing bars, harrow tines and sundry accessories, a comprehensive display of light-alloy fittings for use on farm trailers and in conjunction with other agricultural accessories was on display.

Philip Pierce & Co. Ltd., Wexford, Ireland: The main constructional features of their broadcast spreader include a wood hopper capable of holding 5 to 6 cwt., depending on the density of the material. Rate of spreading can be controlled to sow from 1 to 40 cwt. per acre. A discharge width of 30 ft. can be obtained and a centrifugal agitator ensures a smooth flow to the discharge plate.

Pigloo Products, Brandesburton, E. Yorks: The Pigloo farrowing hut and folding hurdles were on display. The Pigloo itself is designed for outdoor pig breeding, a system that is rapidly becoming popular. It fulfils most requirements of the pig farmer, cuts out loss through scour and reduces other risks. It provides warmth in winter, is cool in summer and provides ventilation without draught. A distinct advantage is that it can be easily moved. Loose doors are provided for sliding across doorway as required, *i.e.* for moving or treatment etc. of pigs.

Plessey Co. Ltd., Ilford, Essex: Equipment on the Plessey stand is fitted by many of the leading agricultural vehicle manufacturers; it included hydraulic rams, hydraulic pumps and control and relief valves. Plessey pumps have alternative drive positions and can be assembled for either direction of rotation, depending on the relative positions of driving or driven gears.

Ransomes, Sims & Jefferies Ltd., Orwell Works, Ipswich: For the farmer with the small acreage, Ransomes offered a vertical-type grain drier in addition to their range of horizontal, continuous-flow driers. The drier is a complete unit and requires no foundations. The heating unit is arranged for oil firing (burning diesel oil) and the temperature of the drying air is thermostatically controlled. The drier is driven by a single 8-h.p. electric motor or a countershaft unit can be supplied instead.

Renold Chains Ltd., Renold House, Wythenshawe, Manchester: Exhibited transmission and conveying chains and wheels for agricultural machinery, including the corrosion-

resistant Mark 5 series, designed as a replacement for malleable and pressed-steel chains.

Rimer Manufacturing Co. Ltd., Factory E.2, Treforest Industrial Estate, near Pontypridd, S. Wales: Manufacturers of belt and bucket elevators, chain and bucket elevators, belt conveyors and screw conveyors, all of which are used in the handling of grain for grain-drying and -storage installations. Also shown was the 'Silica Gel' grain drier (under licence from **Spillers Ltd.,** 40 St. Mary Axe, London, E.C.2).

This process is thermally efficient and gives complete protection against the possibility of over-heating the grain. Samples of malting barley, when tested, show that the germination is not affected in any way whatsoever.

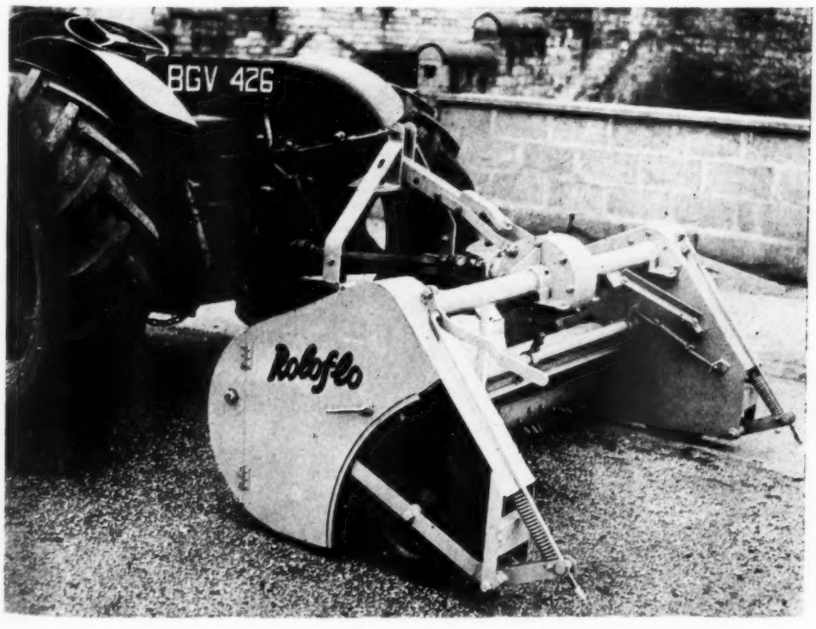
Salopian Engineers Ltd., Prees, Whitchurch, Shropshire: A roof truss of unusual design was of interest; the truss, of tubular construction, gave maximum head room. The price is competitive and delivery is prompt. Also on show were two types of manure spreaders and a four-disk plough.

Scotmec Mechanical Light Industries Ltd., Scotmec Works, Ayr, Scotland: Designed and calibrated by Mr. Oxley, a revolutionary moisture meter capable of measuring any grain, whether in bulk or in sealed sacks, without sampling, was shown amongst a number of other products. The meter

' Nubrex 803 ' lubricator adapted as filler pump for side-lever grease guns, with gun ready to be taken off (pump handle down) (Ch. J. Neuman Ltd.)

can check a whole lorry load of grain in a few minutes by reading the moisture in each sack instantaneously. The instrument is calibrated for temperate climate, but includes a dial which, once set for the prevailing temperature, gives the corrected reading. Scales have been prepared, apart from cereals, for paddy rice, milled rice, cocoa beans etc. The percentage figure is obtained by direct reading.

Roadless Traction Ltd., Hounslow, Middlesex: On show was the rubber-jointed J17 crawler tractor. Two new items were also displayed. They were the Servis-Roadless rotary brush-cutter and shredder and the Manuel-Roadless Fordson Major four-wheel-drive tractor. Both these machines are being manufactured under licence from the **Servis Co.,** Dallas, Texas, and **Selene S.A.S.,** Nichelino, Turin, Italy, respectively.



The ' Roloflo ' hay crusher/crop lifter (Ernest A. Webb Ltd.)

Shell Chemical Co. Ltd., Norman House, 105 The Strand, London: An exhibit showing the uses of insecticides, fungicides and weedkillers in agriculture, with the accent on methods of application of aldrin and dieldrin products. Also exhibited were a number of sprays, including ' Sprex ', a new liquid pre-emergence spray for sugar-beet, mangolds and slow-germinating vegetable crops, enabling crops to emerge in a weed-free seed bed.

Silorators Ltd., 103 Park Street, London, W.1: The Silorator exhibit included a tractor-operated, p.t.-o.-driven machine which cuts, picks up, treats and loads in one operation, and a stationary lacerator blower for all silage crops; a silencer has now been developed which will reduce the noise of the implements by approximately 70%.

Simmonds Aerocessories Ltd., Treforest, Pontypridd, Glamorgan: A recent addition to their range is the tractor dumper. A four-wheel dumper, 10–12-cu.-ft. capacity, equipped with either petrol or diesel engine, three forward speeds and reverse, and patent transmission to the rear axle. With the use of ancillary equipment it can be adapted to power rolling, ploughing, grass cutting, hedge trimming or spraying. Overall dimensions of the Nash ' 12 ' model are length 8 ft. 6 in., width 4 ft., height 3 ft. 11 in.

Spenborough Engineering Co. Ltd., Valley Works, Union Road, Heckmondwike, Yorks: Included in their large range of exhibits were hydraulic trailer rams, tipping gears, pumps, valves and oil seals. A hydraulic pump and motor operating four double-acting ' Rams ' controlled by a new type of valve, No. 1195, acted as a demonstration unit.

Stanhey (Ashford) Ltd., Elwick Works, Ashford, Kent: Of interest was the new model of the seed-spacing drill. Previously used in the planting of such crops as sugar-beet, mangolds, turnips etc., it has now been developed to deal with such seeds as peas, maize, rice, soya bean and sorghum. The drill body and the coulter had been widened,

but the essential features were the same. Stanhey's tractor-drawn, p.t.-o., mobile hop-picking machine was also shown.

Steel Fabricators (Cardiff) Ltd., Pengam Road, Roath, Cardiff: The rear-mounted ' Ditcher ' is primarily designed for heavy contract work; it has a 12-ft. digging depth, 14-ft. reach, 8½-ft. dumping height and 150-degree swing. A p.t.-o.-driven hydraulic pump provides operating cycles of from 10 to 20 seconds and 10 minutes is required for removal or installation on the tractor.

A new loader is of all-welded construction and will lift 2,000 lb. to a 9-ft. dumping height. The bucket has a ½-in. cutting edge and is made in sizes from 42 in. to 66 in. A front-end, crankshaft - driven, hydraulic high - speed pump provides 12 g.p.m. at 1,000 lb./sq. in.

G. F. Strawson & Son, St. Andrew's Works, Horley, Surrey: Durable and strong, the Strawson composite span-roof greenhouse showed itself to be well constructed. The main features were double-channel aluminium sash bars to carry away internal condensation and a patent glaze that assures maximum light admittance and no repainting of glazed areas.

Swift & Swallow Ltd., Airport Works, Rochester, Kent: A new Model ' 32 ' mincer with a very high output was featured on their stand, but of special interest to the meat trade or for general use a semi-automatic scale, giving all-round vision of the turret-type chart with very large, clear divisions, self-levelling and readable from any angle, was exhibited.

Taskers of Andover (1932) Ltd., Waterloo Iron Works, Andover, Hants: A hydraulic tipping farm trailer approved by Ford's, and a number of other types ranging in size from a 5-ton sugar-cane trailer to a 7-cwt. livestock car trailer were included in their display.

Teles Smith Ltd., 8 South Wharf, Paddington, London: For felling and cross-cutting trees in a one-man operation, an 18-in. petrol saw was exhibited, and for the use of two men a 4-ft. 1-in. Teles electric chain saw, capable of cross-cutting timber up to 4 ft. in diameter.

Tractor Shafts Co. Ltd., Smallford, St. Albans: The ' Smallford ' vegetable and nursery stock planter which can plant almost anything from lettuce to kale or broad beans to tea seed was shown for the first time. Twelve different spacings and two different opening coulters are supplied. The ' Smallford ' three-row automatic potato planter, which plants 500 ' sets ' per minute with a choice of four seed spacings, requiring only one operator, was also shown.

E. V. Twose (Manufacturing) Ltd., Lowman Works, Tiverton, Devon: Three new implements were on view. A root gapper available as a complete machine (three, four or five rows) fitted with universal lift pins. A direct p.t.-o.-drive mounted broadcaster for lime, fertilisers, sand, seeds etc., with a capacity of from 5 to 8 cwt., and a non-hydraulic, non-p.t.-o. tractor loader for a variety of materials and jobs.

W. Tyzack, Sons & Turner Ltd., Little London Works, Sheffield 8: Agricultural machine cutting and wearing parts, including machine sickles for mowers, binders and combine harvesters, were displayed. Disks for ploughs, harrows and drills and a range of agricultural hand tools, scythe blades, hay and trussing knives etc. were exhibited by this company.

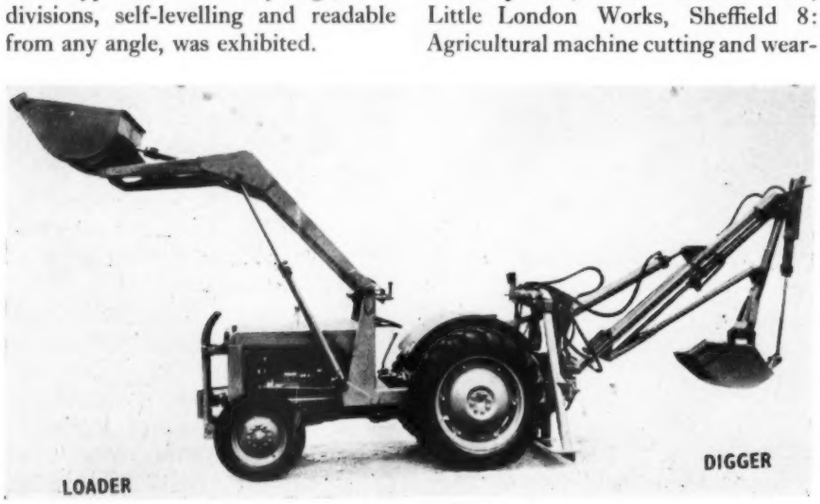
Vigzol Oil Co. Ltd., Vigzol House, Greenwich, London, S.E.10: In addition to their lubricating oil and grease exhibits, Vigzol exhibited for the first time the ' Blitzweed ' spraying machine, a low-volume sprayer with a 50-gal. resin-coated tank, copper spray bars protected in iron channelling, three-stage filtration, universal fittings for the leading makes of tractors, rapid height adjustment and a hinged spray bar in five parts. No tools are required for this machine.

Villiers Engineering Co. Ltd., Marston Road, Wolverhampton: The entire range of two-stroke and four-stroke air-cooled engines, which have been extensively applied to agricultural and horticultural use, was on display. It included two-stroke engines with capacities from 70 c.c. to 353 c.c. and power ratings from 0.55 b.h.p. to 4 b.h.p. All the engines shown were in standard petrol-operated form, equipped with rope and pulley, electric and kick starters and with built-in 3 to 1, 5.2 to 1, 6 to 1 and 6.25 to 1 reduction gears; others can be adapted to operate on paraffin and vaporising oil.

Ernest A. Webb Ltd., Exning Foundry, Exning, near Newmarket: The Webb range of lime and fertiliser distributors, known as the ' Quicspread ', comprised a model on pneumatic-wheeled equipment for towing and the universal tractor-mounted model for mounting to the three-point linkage of tractor driven from the p.t.-o. There were several new features on these machines all designed to improve their efficiency.

Their exhibits also included the Webb ' Roloflo ' hay crusher/crop lifter and the Webb universal steerage hoe.

Also for the first time, the Webb single seeder root drill was shown. It is the outcome of several years' experimental work in this field and has only been introduced to the market after a series of very successful field trials in 1955, and it is hoped to put it in production shortly. It comprises a rotary



Steel Fabricator's new loader and digger

selector wheel which collects seeds from a seed chamber and delivers them singly to the seed guide and thence *via* an ejector unit to the furrow.

F. W. Wheatley (Trailers) Ltd., 133 Thorpe Road, Peterborough: A full range of trailers and accessories was exhibited, including a balance tipper of 50-cwt. capacity and a 3-ton 'Three Way' tipper with double-hinged sides and rear door; body size was 9 ft. × 6 ft. 6 in.

Whitlock Bros. Ltd., Great Yeldham, Essex: The two major exhibits were the 'Dinkum Digger', a tractor-mounted, hydraulically operated trench excavator for drainage trenches, silage and grain pits etc., and a Petkus Linde seed cleaner for which Whitlock Bros. are the sole concessionaires for the U.K., The seed cleaner produces seed 98% pure, and models with capacities of up to six tons per hour are available.

Wicksteeds, Meridian Works, Barkway Road, Royston, Herts: Featured was the latest type of heavy-duty 'Pea Swather Pick-up Reel', suitable for attachment to most popular harvesters.

John Wilder Ltd., 36 St. Mary's Street, Wallingford, Berks: Manufacturers of 'Pitch-Pole', a multi-purpose self-cleaning cultivator, and of the Wilder-Steed forage harvesting equipment, a high-speed one-man outfit for silage makers and grass driers.

The Wilder-Rainthorpe chopper, shown as a straw chopper only, in 1954, was shown converted for high-speed mowing of pastures (pasture topping), chopping up brussels sprouts stalks, kale stalks, bracken and many other growing crops. This versatile machine is capable of picking up, chopping up and spreading back on to the ground straw left in the swath after the combine.

S. M. Wilmot & Co. Ltd., Albert Road, St. Philips, Bristol: Exhibited a range of farm equipment from portable pig shelters, constructed of galvanised iron with a wooden floor, ventilated for summer weather, and despatched ready for use, to 10/12-gal. tubular, steel-handled churn carriers.

Wolf Electric Tools Ltd., Hanger Lane, London, W.5: The complete range of Wolf portable electric tools was displayed, including a mobile electric valve shop, portable drills from ¼-in. to 1¼-in. capacity and equipment for grinding, sanding, wire brushing, fettling etc.

Dressing welded repair with H27 (Wolf Electric Tools Ltd.), fitted with cup grinding wheel

Wright Rain Ltd., Crowe, Ringwood, Hants: Diesel pump D23 was one of the three pumps shown designed specially for sprinkler irrigation. Compact and with a large capacity, it is powered by an Armstrong Siddeley 14/22-h.p. twin-cylinder air-cooled diesel engine. The standard mounting for this unit is a heavy steel, skid-type base plate, but also available is a two-wheel trolley mounting. Type T3 tractor pump is suitable for use with any make of tractor, it is completely mobile, driven by a Hardy-Spicer shaft and equipped with helical gears.

Lightweight aluminium-alloy irrigation pipes were also displayed; these were equipped with self-locking couplings, enabling speedy assembly.

East African Farmers' Requisites

The Export Services Branch of the Board of Trade has announced that the United Kingdom Trade Commissioner in East Africa at Nairobi has advised the branch that the Kenya Farmers' Association (Co-operative) Ltd., P.O. Box No. 35, Nakuru, have recently established a subsidiary company, the Tanganyika Farmers' Association (Co-operative) Ltd., P.O. Box No. 27, Arusha, Tanganyika, to take over their branches in Arusha, Iringa, Moshi and Uwemba.

The parent company, who were established in 1923, are a marketing organisation for farmers' produce, both buying on their own account and as agents for the Government. They have 17 branches throughout the farming areas of Kenya and their interests are very wide, embracing all aspects of the European farming industry of Kenya and the adjacent northern province of Tanganyika other than the sale of farm machinery.

According to a report in the *East African Standard*, the store at Nakuru gives a good idea of the wide range of farming supplies needed to meet members' demands. It holds many types of fencing wire, corrugated iron and aluminium sheets, roofing materials, nails, bolts and nuts, plough disks and most of the items in daily use on many farms.

Then there is a section devoted to veterinary appliances and supplies, including dip preparations of all kinds, plant protectives and insecticides, tyres and tubes, tools of all kinds, particularly of the type used in shamba work, daily equipment, trek gear—the demand has naturally decreased with the expansion of mechanised farming in the colony—paints and distempers, petrol and oils.

To Authors and Readers

The publishers of WORLD CROPS invite the submission of manuscripts of books to be considered for publication. All manuscripts will be promptly acknowledged and carefully considered by qualified experts. A synopsis with chapter headings should be sent in the first instance, addressed to the Book Production Manager.

The publishers are specialists in industrial, technical and scientific books and have a world-wide selling and distributing organisation.

Wide-Angle-Spray Nozzle

A wide-angle-spray nozzle, suitable for both manual and power spraying, has been recently developed by the Dorman Sprayer Co. Ltd., Cambridge, England. The nozzle operates on an entirely new principle and is suitable for both high- and low-volume rates of application, giving very uniform application. The droplets produced are graduated throughout the width of cover and the spray is not more subject to wind drift than the conventional flat fan nozzle of the same capacity.

The nozzle was produced at the request of Mr. A. M. Toms, of the Sudan Gezira Board, for spraying cotton in the Belgian Congo, where large acreages have to be sprayed. The cotton, being grown in small plots of up to 2 acres, is unsuited for power spraying and an added difficulty is the shortage of water in many regions. The required nozzle was to be simple in design and suitable for operation by native labour. A coverage of 15–20 ft. was required with an application rate of under 5 gal. per acre at 2 m.p.h.

These requirements have been met by the new nozzle; the tip, having a single orifice and incorporating the standard Dorman screw-in filter, is virtually unchokable. It has been produced with a tip with a capacity as low as 2 gal. per acre with 21-ft. cover and in sizes up to 5 gal. per acre with 15-ft. cover.

Preliminary tests were carried out in pasture heavily infested with thistles and the results indicated that the nozzle had much greater possibilities than were at first envisaged. After further development work a range of nozzles has been produced suitable for use with power sprayers, giving application rates of from 5–50 gal. per acre, with a width of cover of 30–50 ft. These have been field-tested on pasture and by controlling black fly on sugar-beet and sugar-beet seed. In the latter cases 'Metasystox' was applied at from 37.5 to 50 gal. per acre and the application has proved extremely effective. Two nozzles were fitted to the extremities of a standard 30-ft. boom to give an overall coverage of 60 ft., which materially reduced the mechanical damage of the beet crops under treatment.

Further tests are being carried out in a number of localities on pasture spraying and for the destruction of potato haulm, using concentrated sulphuric acid and sodium arsenite. The nozzle is also being tested in a number of overseas territories and it is hoped that sufficient information will be available to enable definite recommendations to be made for cereal and insecticide applications before next season.

Where a sprayer is working over very rough ground, the sprayboom can be replaced by a single nozzle or, where working under normal conditions, two nozzles can be fitted to the sprayboom to get a very wide spray width. It has been found that all types of sprayboom are not suitable for use with multiple nozzles and the nozzle will be made available as an optional extra with Dorman spray equipment.

Solving the Brush Problem in Australia

THE brush problem on range-land made it necessary to develop methods of clearing other than by fire, explosives and chemical poisons, which damaged the natural grass.

Ingenuity in scrub clearing has produced many varied devices, most of them adapted to suit particular requirements in heavily timbered areas throughout the world. One of the best-know methods is the use of a heavy chain, each end of the length being attached to the drawbar of a crawler tractor. The first sweep flattens the scrub and the returning sweep usually uproots it. The main drawback with this method is that heavy trees, even when felled before the chain sweeping starts, present obstacles over which the chain must be lifted.

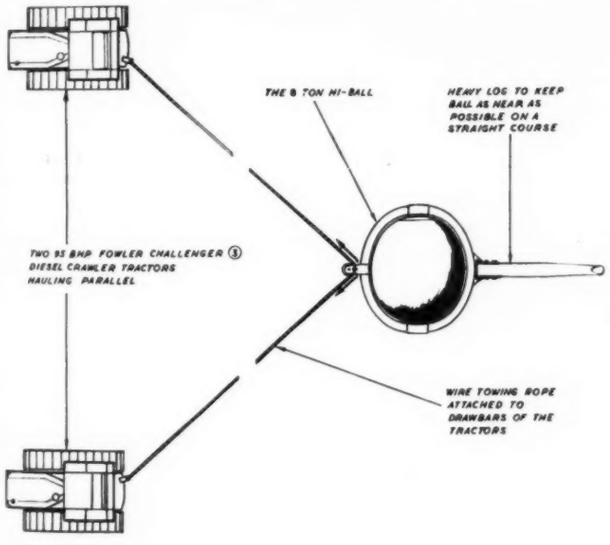
On the Congeling Park estate of Fowler Bros., near Williams in Western Australia, the method of scrub clearing dispenses with the need for removing heavy timber from the area before sweeps, even though previous felling of larger trees is required.

At a recent 'field party' at Congeling Park this method was well demonstrated by using the scrub-clearing 'Hi-Ball' (see WORLD CROPS, 1951, **3**, 232; 1954, **6**, 420), which is an egg-shaped structure with welded-steel sections supported inside by steel framework. Designed by Aubrey Fowler, it is 8 ft. high and weighs 8 tons. A heavy log behind the ball keeps it rolling as near as possible on a straight course.

An innovation introduced by Mr. Fowler is that, instead of the wire rope attached to the tractors being fixed to the spindle and at each side of the ball, a heavy pulley is fastened in front of the ball on a yoke, allowing the ball to move freely along the rope, the advantage being that, instead of remaining in a fixed position between the two

Aubrey Fowler's 8-ton 'Hi-Ball' during scrub-clearing operations at Congeling Park, Western Australia

'Challenger 3' crawler tractor equipped with tree pusher and tree canopy felling heavy timber before commencement of the 'Hi-Ball' operations


THE 8 TON HI-BALL
HEAVY LOG TO KEEP BALL AS NEAR AS POSSIBLE ON A STRAIGHT COURSE
TWO 95 BHP FOWLER CHALLENGER ③ DIESEL CRAWLER TRACTORS HAULING PARALLEL
WIRE TOWING ROPE ATTACHED TO DRAWBARS OF THE TRACTORS

Diagrammatic representation of Aubrey Fowler's 'Hi-Ball' as towed by two 'Challenger 3' diesel crawler tractors

AUBREY FOWLER'S HI-BALL

tractors, it can roll towards the heavier obstructions and use its own momentum to assist in dragging down heavier trees. The trees on the estate are a mixture of white gum and mural with scattered jarrah and red gum up to 2 ft. in diameter. In a typical operation the 'Hi-Ball' was hauled by a Fowler 'Challenger 3' diesel crawler tractor, with another crawler hauling parallel.

A third tractor proceeded out front, pushing over the largest trees with a tree-pusher attachment, and then moved behind to pull out stumps not uprooted by the 'Hi-Ball'.

As can be seen from the photographs, the operation proved the effectiveness of this particular method of scrub clearing.

The Fowler brothers, who are direct descendants from the original Fowlers of Leeds, are the biggest farmers in the Great Southern area and their two properties, Congeling Park and Beaufort Downs, total approximately 35,000 acres.

The 'Challenger 3' tractor, which is used on the estate, is the 95-b.h.p. machine manufactured by John Fowler and Co. (Leeds) Ltd., England.

Correspondence

Grassland = Cheaper Food

TO THE EDITOR

DEAR SIR,

In your Editorial Comment in the November 1955 issue of WORLD CROPS you draw attention to Mr. Hamilton's excellent paper to the British Association entitled 'Utilisation of Grassland'. I would agree wholeheartedly with your comments that in orthodox hay-making, which is so dependent upon weather conditions, there is a considerable risk of loss of nutrients and that silage-making eliminates many of these risks. I would disagree, however, with the *inference* that hay-making is a wasteful process incapable of being improved and that silage-making is the only alternative. Disregarding orthodox grass-drying, which is generally unsuited to use of medium and small farms due to the high capital outlay and the constant labour demand during the busiest months of the year, there are still two further alternative methods of dealing with high-quality grass crops.

The first, well known, but perhaps not so well understood, is tripodding, and with this we must include the use of various forms of racks for supporting the crop in the field where the wind and sun can complete the drying process. Secondly, there is the process known as barn hay drying, which, though it is well tried, is little known at the present time. The technique here is simple and consists merely of a short intensive wilting in the field followed by forced ventilation with cold air under cover in the barn, capital depreciation, labour and running costs accounting for no more than £5 per ton dried.

Perhaps these remarks will help to give the wider picture and also give a more cheerful outlook for those who, conscious that they can grow good grass crops, are finding it difficult to conserve them without undue loss of feeding value.

Yours faithfully,

P. FINN-KELCEY,
The Electrical Research Association,
Field Station,
Shinfield Road,
Shinfield Green,
Reading, Berks.

Australian Rice Industry

Backed by an American millionaire and an Australian company, a rice-growing syndicate hopes to have 5,000 acres under cultivation at Humpty Doo, 40 miles from Darwin, in Australia's Northern Territory, within three years.

The syndicate is working on a 15-year plan, and hopes to split up the area among share farmers and soldier settlers, each with a 500-acre block turning out an annual crop worth £A15,000. An experimental area of more than 20 acres has now been successfully established.

The syndicate claims that seed from the experimental area could grow 300 acres of rice, and the following year would provide enough for 5,000 acres. Under the supervision of an American rice agronomist, a dozen rice types from Australia, New Guinea, Burma, Malaya and the U.S.A., were sown this season. The germination ranged from 20 to 60%.

Next season the experts expect to get a germination up to 85%. The New Guinea rice proved the most successful, because of similarity of climate. It will be the principal seed used at Humpty Doo.

The syndicate also claims a world record for the number of grains per head. One variety had averaged 500 grains to the head, whereas the number of grains per head in the U.S.A. had never exceeded 280 grains. A visiting party of newspapermen saw the Humpty Doo expert count a total of 685 grains from a head of the New Guinea variety known as Madang White.

Conditions for rice growing in the Northern Territory last season were not good. The late wet season delayed planting and there was a continuous battle against geese and other wild-fowl. Two ex-soldiers, known as 'the rice patrol' on the Humpty Doo property, shot hundreds of geese, and they killed an average of four deadly snakes each night. It is intended to employ aircraft to round up the geese from the fields next season.

Importance of Tobacco Research

Mr. J. M. Caldicott (Minister of Agriculture, Federation of Rhodesia and Nyasaland) told the Federal Parliament recently that, despite great strides made in raising the quality of the tobacco crop, he doubted if 'we are in the position to face the full blast of American competition.' The dollar shortage was easing, he said, and sterling would become completely convertible. He hoped that the new agreement between the Government and the Rhodesia Tobacco Association would lead to an increased tempo of research. Mr. Caldicott was introducing the second reading of the Tobacco Marketing Bill, the Tobacco Levy Act and the Tobacco Research Bill.

With regard to the Marketing Bill, Mr. Caldicott said it would apply to the two Rhodesias, but not to Nyasaland, except in regard to two matters—export control and the fixing of minimum prices. It was mostly concerned with the marketing of flue-cured tobacco, but fire-cured tobacco would be included because there was a small acreage grown in Southern Rhodesia and sold on the Salisbury floors. Under the Bill, Northern Rhodesia tobacco, previously sold by permission of the Southern Rhodesia Tobacco Marketing Board, would be sold as a right, but the Board had found it necessary at present to insist that it be sold identified. It was probable that tobacco from the north-western area would be accepted unidentified within two years' time.

The view of the Federal Government was that it was a matter for the industry, but the Government hoped that there would be no undue delay in the buyers' acceptance of Northern tobaccos on unidentified sales. With regard to the Tobacco Levy Act, the Minister said that, as with the Marketing Bill, the Act applied only to the two Rhodesias. The Bill did not provide for a levy on tobacco grown by Africans in Southern Rhodesia.

Successful Rice-Cultivation Experiments

Trials aimed at increasing the yield of British Guiana's rice lands have proved successful. At the Cane Grove Land Settlement Scheme on the East Coast, Demerara, visiting rice producers saw the startling results obtained by using fertilisers. Five acres of experimental rice lands which, on previous occasions, yielded only six bags of rice per acre, produced with the use of fertilisers 106 bags per acre.

The experiment was carried out by the Department of Agriculture.

A number of farmers who co-operated with the Department carrying out field experiments on their present crops have had similar increases in yields.

Prospects for New Farming Area

The new south-east railway link from Southern Rhodesia to Lourenco Marques could open up several thousand square miles of country which has so far been quite inaccessible and almost completely uninhabitable. This was stated by Mr. P. Gordon Deedes, chairman of the Natural Resources Board, in Salisbury recently. Mr. Deedes was commenting on a recent five-day tour of a native purchase area, comprising about 1,250,000 acres near the south-eastern border of Southern Rhodesia, which he made with the Director of Native Agriculture, Mr. R. M. Davies. Mr. Deedes said that the rail link had completely changed the economic outlook of settling Africans in this part of the country. Provided a bold and successful programme of water development was undertaken, the area would undoubtedly play a large part in supplying more beef for Southern Rhodesia. Cattle in prime condition could be railed direct to their destination.

Aerial Top-Dressing Advances in New Zealand

New Zealand estimates that since experiments began in aerial top-dressing at Ohakea in 1948, 750,000 tons of phosphate has been distributed by aircraft on hill country, which would have taken the equivalent of 1½ million man and packhorse days.

The New Zealand Meat Producers' Board set up in 1954 an Aerial Top-dressing Committee, which makes recommendations to the Board for the granting of loans to aerial top-dressing firms to assist them in converting to modern aircraft.

New Methods for Pest Control

IN the January 1955 issue of WORLD CROPS an article was published entitled ' The Developments of Spraying Machinery ' by R. C. Courshee, B.SC. The West German manufacturers, Gebr. Borchers A.-G., have supplied supplementary information on the application of cold fog for pest control.

Aerial fog method

Development of the technique at present aims at the use of the highest possible concentration, with a consequent reduction in filler materials.

The usual normal requirement of 600 l. of solution per ha. was reduced firstly to 200–250 l. and then to 50–200 l. per ha., with particles ranging in size between 100 and 300 microns. The time factor was almost halved.

With the aerial fog method, economies with filler materials have been carried to the extreme ; besides increasing the concentration of active material, the droplets of fog have been developed to an average size of 15–30 microns. The active materials are dissolved in non-combustible and easily evaporated solvents (boiling above 0° C.), which, with compressed air or specially adapted pneumatic nozzles, are emitted as fog. The solvents evaporate rapidly, causing the droplets, now consisting of the pure active material, to shrink to the required size.

Advantages

(i) A film of fog settling on cultivated plants cannot be dissolved or washed off by rain, hence the duration of efficacy is increased many times, making, as a rule, only one treatment necessary.

(ii) Average consumption of fog solution, depending on the height and density of the plants under cultivation, ranges from 5 to 20 ha. per l.

(iii) Because of the considerable spraying radius (range of fog from site of apparatus 400–500 m.) plots need not be crossed on foot and, therefore, damage to plants is avoided.

(iv) One machine can spray 100–150 ha. per day.

(v) As the method requires no heat for the emission of fog, no loss of active material occurs.

Adaptability

The aerial fog method has been used in Germany for the efficient control of all pests in forestry and for the control of cockchafer, cherry-fruit fly, wheat midge, mosquitoes; houses, hotels, barracks and stables have been disinfected with this method; and flies, cockroaches and bugs have been destroyed.

Fog solutions are made with bases of modern organic insecticides, such as DDT, BHC, dieldrin, aldrin etc., or from combinations of these. Modern fungicidal fog solutions are being developed and will be ready for distribution shortly.

Further information concerning this method of pest control, price of apparatus, fog solutions and the results of recent research will be supplied by Gebr. Borchers A.-G., Goslar am Harz, Germany, to those interested in this subject.

Since the second world war scientists have been experimenting on the development of tropical agriculture in the varying and often difficult climatic regions of Australia's Northern Territory. These two illustrations show an officer of the Lands Department, Northern Territory Administration, inspecting a rice crop at the ' Sixty Mile ' on an experimental area 60 miles south of Darwin. Irrigation is achieved by damming a creek.

NEW PUBLICATIONS

The Manufacture of Copra in the Pacific Islands

By V. D. Pieris. Technical Paper No. 82. Pp. 37, illustrated. Noumea, New Caledonia: South Pacific Commission. 1955. 6s.

The coconut palm provides the most important export of the South Pacific islands. Yet copra from the South Seas has long had the poorest of reputations for quality. The South Pacific Commission, charged with the task of advancing the well-being of the people, in 1952 engaged Mr. Pieris, an agriculturist with experience of the crop in Ceylon, to study the coconut industry and make recommendations for its improvement. Following two years spent in covering the main copra-producing islands of the South Pacific, he gives in this paper his observations relating to the harvesting of the nuts and preparation of copra for shipment.

The author does not overlook the difficulties of securing a product of good quality from innumerable smallholdings on scattered islands, some difficult of access and seldom visited by ships. He is at pains, however, to show that it will profit the producer to raise the quality of his copra, and that, unless this is done, he may lose his place in a market likely to become increasingly competitive.

In an account well illustrated by photographs, he goes on to describe how he found copra being prepared in different islands of the South Seas, how defects were caused and in what ways, sometimes quite easily, the methods might be altered to overcome these faults. He condemns sun-drying as quite undependable and urges the abolition of smoke-driers if copra of any quality is to be produced. A description is given of four types of driers which are both efficient and economical in use, some suited to the small producer, some for the larger and more progressive estates. Along with the use of efficient driers is recommended a simple system of inspection and grading by agricultural authorities throughout the area so that a standardised product is exported.

Mr. Pieris's report is admirably lucid and concise. Good illustrations and clear plans show the construction of the recommended driers. This record of things as they are, and as they might be, will be found of value to all concerned in the industry, whether growers, buyers or administrators. If generally accepted and put into effect, the author's recommendations may bring a new look to South Seas copra and a more assured revenue to the Pacific islands.

T. A. RUSSELL

American Potato Yearbook, 1955. New Jersey: C. S. MacFerland, Jr. $2

The current volume of the 'American Potato Yearbook' contains 84 pages and much vital information for the grower, shipper, researcher and others connected with potatoes in any way. A new section in the volume is the 1955 Onion Supplement. This contains recently published articles on onions, together with other useful information.

Corn and Corn Improvement

Edited by George F. Sprague. Pp. xiv + 699. New York: Academic Press Inc.; London: Academic Books Ltd. 1955.

This is the fifth volume in the series of monographs prepared under the auspices of the American Society of Agronomy. It is devoted solely to the maize plant, colloquially called 'corn' in America; other cereals are not discussed. The editor states that for the aim of the book 'It has been assumed that the particular agronomic audience to be served is the research worker and advanced student interested in corn'. In this the book can be said to succeed. The subject matter covered in 16 fully documented chapters falls broadly into three groups: breeding, production and utilisation. Other authors (14), distinguished by their original researches with maize, take part and all except two work in Iowa, Indiana, Ohio and Illinois. It is not unexpected, therefore, that the book shows bias towards recent researches in the heart of the mid-west American corn belt.

P. Weatherwax and L. F. Randolph describe what is known of the history and origin, and state that it is not yet understood how corn originated, but wild corn was indigenous to Central Mexico many thousands of years ago, and cultivated corn has been in existence for at least 3,000 years. Then follows well-illustrated chapters on vegetative morphology and details of the reproductive organs. A long detailed chapter on the cytogenetics of maize by M. M. Rhoades is addressed to the advanced student of cytology. This is unlikely to be understood by farmers, but is of great interest to cytogeneticists. Gene symbols are sometimes used without indicating to what characters they refer. The editor then contributes a valuable account of modern methods of maize breeding, including ways of producing improved inbreds and hybrids, and synthetic varieties. There are chapters devoted to mineral nutrition, climatic requirements, corn culture and the important task of hybrid seed production. These are mainly addressed to a mid-western audience, and so advances in methods outside this area are not included, *e.g.* the fundamentals of maize-seed contamination. The importance of soil fertility is noted, but the value of crop rotation to reduce soil erosion is not discussed.

There are short chapters on popcorn and on sweetcorn. The latter suffers by comparison with Huelsen's recent monograph on this horticultural crop, which is steadily gaining in popularity outside America. Diseases of maize in the U.S.A. are described in a well-illustrated account by A. J. Ullstrup. Increasing attention is being paid to cold germination tests, for poor germination is a limiting factor not only in North America, but also in Northern Europe. F. F. Dicke contributes an ably written account of the most important insect pests, but fails to mention the frit-fly, which can limit maize growing in England and other European countries. In a fascinating chapter on industrial utilisation, Dr. Sprague reveals what happens after the corn crop has left the farmer, and he describes the amazing number of products that man is able to obtain from one cereal. The book concludes with a summary on the nutritive value of maize, especially in relation to pig and cattle feeding, and ends with a summary of the world production of maize.

As the editor has emphasised, the greatest value of this book appears to lie with teachers at universities and technical institutes, who will find here

a well-organised symposium of facts about maize readily available for instructing students of biology and agriculture.

G. HASKELL

Advances in Genetics

Edited by M. Demerec. Vol. VII. Pp. ix + 309, illustrated. London: Academic Books Ltd. 1955. U.S. $8.

Volume VII of this excellent review series, primarily intended for specialists, contains six contributions, of which only one is likely to be of direct interest to those who are mainly in search of information relevant to crop production. Written by Dr. R. Takahashi, of the Ohara Institute for Agricultural Biology, Okayama University, Japan, the paper in question deals with the complex problem of the origin and evolution of cultivated barley. While most investigators are in general agreement that the two wild species, *Hordeum spontaneum* and *H. agriocrithon*, with two-rowed and six-rowed ears respectively, are the most probable progenitors of the cultivated barleys, the views expressed concerning the possible paths of evolution from the brittle-eared wild types show considerable divergence. After carefully examining the various hypotheses, the author puts forward his own theory, based largely on the differences shown by present-day barleys with respect to the two complementary hereditary factors governing ear toughness. He suggests that six-rowed, cultivated barley first arose from *H. agriocrithon* somewhere in eastern Asia by mutation of one of these two factors, the combination of the altered and unchanged factors resulting in tough ears instead of brittle. The two-rowed, cultivated form later originated from *H. spontaneum* in south-western Asia by a similar mutation affecting the other factor. Repeated crossing of the two-rowed with the six-rowed form, which had in the meantime greatly extended its geographical range, resulted in many new two-rowed and six-rowed types and was responsible for the present-day variation in genetic composition for ear toughness. Continuing the story, Dr. Takahashi discusses the heritable adaptive changes which have subsequently occurred in the external and physiological characters of cultivated barley in response to environmental conditions and human selection; fundamental knowledge of such genetic and geographical differentiation is essential in breeding improved varieties by modern methods.

P. B. Sawin surveys recent advances in the genetics of the domestic rabbit. V. Bryson and W. Szybalski deal with the important medical problem of drug resistance in micro-organisms. J. A. Moore discusses abnormal combinations of nuclear and cytoplasmic systems in frogs and toads. A. A. Buzzati - Traverso considers evolutionary aspects of the *obscura* group of *Drosophila* or fruit fly—that prolific favourite of genetical investigators. *Drosophila* is also the main subject of chromosomal polymorphism in the diptera by A. B. da Cunha.

THERESA ASHTON

Reports on the Progress of Applied Chemistry

Vol. XXXIX. 1954. Pp. 1125 (Section reviewed pp. 643–885). London: Society of Chemical Industry. 1955.

A materially increased amount of space has been devoted this year to the ' Food and Agriculture ' section in this invaluable annual survey of current research in applied chemistry. As always, the work done by the numerous contributors merits the gratitude and the respect of industry and scientific research as a whole. Obviously there is some variation in the skill with which the separate subjects are treated, but in every instance the enormous amount of preliminary work has been done conscientiously, and often the final result is, in itself, an extremely interesting scientific paper. It would be invidious to select for praise any one paper.

The ' Food and Agriculture ' section opens with the sub-section ' Agriculture and Horticulture ', which has a general introduction by Mr. A. G. Pollard, B.SC., A.R.C.S., F.R.I.C., followed by chapters on ' Soils ', ' Fertilisers ', ' Crops ', ' Horticulture ', ' Animal Nutrition ', ' Analysis ' and ' Trends in Engineering '. This sub-section has suffered greatly at the hands of some printer's devil (or perhaps the sour bookbinder referred to on p. 725), who has introduced hyphens at random, has inserted or removed commas in order to obscure meaning, and has generally done all that is technically possible to damage a very good job of work. We read (on p. 649) ' Copper- and cobalt-deficiencies were sometimes associated with the absence of ferromagnesium, ferrocalcium minerals from soils'. On p. 670 'Mo deficiency' occurs on one line, 'Mo-deficiency' is found three lines below. Probably the same agent has, on p. 667, been responsible for the transmutation of two adsorbs to absorbs. However, for the most part, the original intention of the authors is still clear and the sub-section, though scarred, is still very much alive.

The second sub-section, again introduced by Mr. A. G. Pollard, is on ' Control of Pests ', and contains reviews headed ' Agricultural Fungicides ', ' Agricultural Insecticides ', ' Control of Plant Nematodes ', ' Some Non-Agricultural Uses of Insecticides ', ' Veterinary Medicines ', ' Trends in Engineering in Control of Pests ' and ' Analysis of Insecticides '. This sub-section, also, is excellent in its matter, but contains too many printing errors and, furthermore, American spelling and usage has been incorporated at times so that, even in the index, one finds ' roach ' listed separately from ' cockroach ' with no indication that the two are, in America and presumably in Canada but not in England, synonymous. As an example of obscure and presumably inaccurate English a paragraph on p. 714 may be quoted: this contains the statement ' The free phenol has been shown . . . to kill bees from dry deposits . . . '. Surely, on a final revision, this whole paragraph should have been rephrased.

Valuable sub-sections follow on ' Essential Oils ', ' Sugars ', ' Starch ' and ' Brewing, Malting and Allied Processes '. These will be found to be of general interest to all who are concerned with the chemistry of life, and invaluable to those with special interests in these fields.

The sub-section on ' General Microbiological Processes ', by members of the Microbiology Group, reviews ' Autotrophic Micro-organisms ', ' Microbiology of Water and Sewage ', ' Food Poisoning and Food Spoilage ' and ' Microbiological Assay '. It is very wide in scope and clear in presentation.

Two further sub-sections, on ' Enzymes ' and ' Food ', complete this part of the volume. Each of these is of

the high standard expected from the contributors to the Reports. The subsection ' Food ' is especially interesting and is set out with great clarity and economy. It contains chapters on ' Dairy Products ', ' Eggs and Egg Products ', ' Cereals and Cereal Products ', ' Fruit and Vegetable Storage ', ' Preserves ', ' Canning ', ' Frozen Foods ' and ' Hygienic Food Handling '; the last constitutes a welcome innovation this year.

The food scientist, the modern farmer and, indeed, any biologist cannot fail to be stimulated and instructed by this publication. Moreover, much of value will be found also in other parts not devoted specifically to food and agriculture. The only general criticism that can be made is that it is a pity that a publication of this type, which undoubtedly will be read by students in their formative years, should suffer from insufficient care in its presentation. One is tempted to echo a complaint made on p. 707, about some papers under review, that the matter of the reports also suffers from ' inadequate proof-reading '. This, however, should not blind us to the value of the volume, which should find a well-merited place in every science library.

ALAN FISK

REPORTS

FAO Publications

Fact-Finding with Rural People. 7s. 6d. (U.S. $1.50). This manual is intended for the use of government officials and others who may have the responsibility of organising and conducting rural surveys of one kind or another but are unfamiliar with the use and methods of social science. It may also be useful in colleges or other institutions where rural welfare workers are trained. To help readers to advance their knowledge of scientific social survey work and research, the standard texts are listed in the references for further reading.

Output and Expenses of Agriculture in Some European Countries, Second Report: 1950–53. 5s. (U.S. $0.70). In January 1953 the ECE/FAO Secretariat in Geneva published a report entitled ' Output and Expenses of Agriculture in Some European Countries '. This report resulted from an attempt to assemble for the first time the respective national statistics dealing with certain aggregate money values for the agricultural sector of the economy. The material was used mainly to compare the structure of agriculture in the various countries by examining the composition of farmers' gross receipts and the relation between receipts and various items of expenditure; to summarise the main developments since the war; and to discuss questions of definition and method and the ways in which the data could be improved from the point of view of international comparability. In view of the considerable interest shown in this first report, the ECE/FAO Secretariat has continued to collect detailed statistics from European countries and have published their findings in this second report.

Bibliography on Land Tenure, 1955. 17s. 6d. FAO, with the support of the United Nations, the International Labour Office and the United Nations Educational Scientific and Cultural Organisation, presents this trilingual ' Bibliography on Land Tenure ' to facilitate reference to books, pamphlets, articles and laws related to the subject of land tenure and land reform. The compilation is based on two main sources: on material in the combined libraries of the FAO and the former International Institute of Agriculture and on research carried out in the U.S.A. through the agency of the University of Wisconsin, with the support of certain U.S. Government agencies.

It is to be hoped that this bibliography will prove useful to governments, agricultural specialists and other students of land tenure in their endeavours to arrive at an understanding of agrarian questions, and that it will assist their efforts in seeking practical solutions to important problems.

An Annotated Bibliography of Rice Soils and Fertilizers, by G. V. Jacks and M. Kathleen Milne. Rome: Commonwealth Bureau of Soil Science, Harpenden, England, and FAO. 1954. 7s. 6d. This annotated bibliography is prepared from the references contained in the card index maintained by the Commonwealth Bureau of Soil Science. The bibliography is arranged in three main sections: I. Soils. II. Cultural Operations (including irrigation). III. Fertilisers (including nutrition).

World Pulp and Paper Resources and Prospects. 6s. 3d. A survey prepared by the FAO in co-operation with the secretariats of UNESCO, ECE and the Economic Commission for Latin America. This survey shows that world paper consumption, which averaged 47 million tons annually during 1950–52, is estimated to rise to 65 million tons annually by 1960–62. About 13 million tons of this increase will take place in Europe and North America. These two regions today satisfy a substantial proportion of the needs of the rest of the world. Though a considerable increase in production in these two regions is expected, the surplus available for export to the rest of the world is not likely to grow very rapidly.

The four less-developed regions of the world—Latin America, the Far East, the Near and Middle East and Africa—together with Oceania, today consume about 4.5 million tons of paper. Of this, well over a third is imported from Europe and North America, as well as about half a million tons of pulp. By 1960–62 their paper requirements are expected to rise by close on 4 million tons.

Numerous new pulp and paper projects are now being built or are under consideration in all these regions. Leaving aside developments in China and Japan, the expansion contemplated in the coming decade corresponds to just over half the expected increase in requirements.

Directory of Wheel and Track-Type Tractors Produced Throughout the World. 15s. The information contained in this trilingual directory has been obtained from the manufacturers themselves or from official publications. In order to extend its usefulness and appeal it has been published in English, French and Spanish and specifications are given both in the metric and English systems.

The Stabilization of the International Trade in Rice, Commodity Policy Studies No. 7. 2s. 6d. This study deals with many facets of world production and consumption of rice. Among the

recommendations it gives at the conclusion of the study are:

'Exporting countries should hold national stocks in addition to the stocks held against their normal requirements. Some importing countries also may hold such stocks as food reserves. Countries would endeavour to follow a co-ordinated national stock policy. The inter-governmental group would offer guidance to each country on its most appropriate action in the general interests of stability.

'The aggregate of national stocks held by exporting countries should be equivalent to at least six months' exports, at present 2 to 3 million tons of rice, or 2 to 3% of world output. Most of them would need to expand and improve their storage facilities. As greater stability would benefit all producers and all consumers, the less developed countries would have good grounds for seeking international assistance to enable them to carry adequate national stocks'.

Jute Manufactures. London: Published for the Commonwealth Economic Committee by H.M.S.O. 1955. 2s. 6d.

This memorandum summarises the main figures of production and trade in jute manufactures during recent years up to the end of 1954, together with prewar comparisons.

Cyprus: Annual Report of the Agricultural Officer (Research) for 1954

This report is divided into two parts, the first dealing with agronomy. The work done in this respect illustrates the possibilities and problems of two major items of agricultural development: the one, cereal improvement, is fairly sharply circumscribed and offers considerable opportunities for development through technical advance alone; the other, pasture and forage development, is much more diffuse in character and, whereas it has very important technical problems which have to be answered, wider issues covering the whole structure of better land use intrude, complicate and unavoidably delay developments which are technically feasible.

The second part of the report is devoted to the work of the Plant Protection Department. With the increase of the plant protection staff, departmental activity in plant protection has shown a notable increase. Sixteen experimental projects on the study, biology and control of economically important pests were conducted during the year. Over 150 demonstrations on control measures against insect pests were carried out. Greater use was made of the radio and of the departmental publication, 'The Countryman', to give farmers timely information and advice on insect and disease control. Farmers' interest and activity in insect and disease control has also shown an encouraging increase, and there is a growing tendency on the part of the larger farmers to make disease and pest control standard practices in crop production.

S.P.C. Publications

A List of Communicable Diseases and Parasites of Domestic and Some Other Animals Recorded in South Pacific Territories, by L. J. Dumbleton. 2s. Some information on the occurrence of diseases and parasites known to occur in the territories was submitted by delegations to the Plant and Animal Quarantine Conference sponsored by the S.P.C. held in Suva, Fiji, in April 1951. The lists in this paper have been compiled from this information, but published sources have also been drawn on. The primary division in the systematic list is into diseases, endoparasites and ectoparasites.

A List of Plant Diseases Recorded in South Pacific Territories, by L. J. Dumbleton. 2s. The lists in this paper have been compiled from information recorded at the Plant and Animal Quarantine Conference and additional data has been incorporated whenever it was available. Where diseases were identified under scientific names which have now fallen into synonymy the currently accepted names have been used. In most of these cases the relevant synonymy is indicated.

Committee on Work on Plantations.

A general report published in 4 vols. (Geneva: International Labour Organisation.) 1955.

Vol. I, item 1 (*a*), deals with the action taken by 10 of the 18 member nations as a result of resolutions adopted at the second session of the Committee. The countries are Australia, Belgium, Burma, Ceylon, the Dominican Republic, France, India, New Zealand, Pakistan and the United Kingdom. Item 1 (*b*) is concerned with the action taken by the governing body and the ILO office on such problems as employment conditions of plantation workers, national economies and the need for international commodity regulations etc.

The second volume, sub-titled Report 1, item 1 (*c*), reviews plantation crops, including tea, sugar, rubber, tobacco and cotton, under the four headings supply, demand, prices and controls, in order to show more clearly the various trends the crops are taking.

Vol. 3, Report II, includes an introduction to the labour problems of Latin America and Africa. Questions of scientific research, work organisation and productivity are also discussed.

The fourth volume, Report III, deals with methods of stabilising employment and wages of plantation workers, and the influences of general economic and trade policies of the importing countries on the stability of plantation economies.

The report is well illustrated graphically.

Empire Cotton Growing Corporation

We have received copies of progress reports from experiment stations for the season 1953–54.

Report on the National Agricultural Advisory Service, The First Eight Years, 1946-1954. London: H.M.S.O. 3s. 6d.

The National Agricultural Advisory Service was established in 1946 to give free technical advice on agriculture and horticulture. This account of its work during the first eight years will be read with wide interest. It describes the structure of the service and the varied nature of the technical assistance which the service gives, and outlines some of the achievements of the early years. Reference is made to the recruitment and training of N.A.A.S. officers, how they are kept up to date on technical advances and the methods used to help the farmer. In addition to reviewing past achievements and the work now being done, the report does not overlook the problems which have yet to be solved. The progress made in the first eight years promises well for the future.

Fertilisers, Production-Consumption, Trade and Prices in European Countries, 1952-1955. Paris: OEEC

Among the interesting accounts in this publication are the following:

' In most countries, production, consumption and trade in fertilisers increased in 1953–54. The increases in production of fertilisers in OEEC countries in 1953–54 over 1952–53 was 7% for nitrogen and 10% for phosphates and potash. The increase in each case was greater than the increase in 1952–53 over 1951–52. Estimates for 1954–55 indicate a further increase of 13% for potash, 8% for phosphate fertilisers and 7% for nitrogenous fertilisers '.

'Consumption of fertilisers in OEEC countries in 1953–54 increased by 14% for phosphate fertilisers, 11% for potash fertilisers and 9% for nitrogenous fertilisers. The increase in consumption of all three plant nutrients was greater than the increase in production '.

Scientific Publications of the Instituts für Länderkunde. New series. Nos. 13 and 14. Leipzig, Germany :

From time to time since 1896 the Instituts für Länderkunde has issued its wide-ranging studies into various aspects of geographical knowledge. The present edition, under the editorship of Prof. Dr. Edgar Lehmann, Director of the Institute, contains two lengthy papers devoted respectively to the geography of tropical Africa and the district of Bad Salzungen (Germany), with shorter contributions on the subject of stock farming in Angola and the facilities offered by the Institute's own archives.

Of particular interest to British readers is the section on tropical Africa, which has been contributed by Prof. Joachim H. Schultze of Jena. This comprises a detailed survey of the economic geography of the two large regions of West Africa (including the Gold Coast, Nigeria, Dahomey, Togoland and the Cameroons) and East Africa (Tanganyika, Uganda, Kenya, Ruanda-Urundi and Zanzibar and Pemba). The author first outlines the main natural regions into which these two large African areas fall before taking each political entity separately and examining it from the viewpoint of population, natural resources, mineral wealth and transport (road, rail and water). For each of these factors a map in attractive colours is provided in an accompanying folder, and by studying the maps in conjunction with the appropriate section of the text an unusually clear picture of the territories under consideration is obtained. It is a matter for some regret, therefore, that practically all the information, both in maps and text, is based on prewar data.

This criticism does not apply to Dr. Klaus Hatterbach's work on the Bad Salzungen district, for a great deal of up-to-date research has gone into this absorbing study which deals in the most thorough manner possible with every conceivable aspect of this tiny area (less than 600 sq. km. in extent). Similar considerations apply to the short, concise study of stock farming in Angola by Dr. Johannes Gellert, of Potsdam.

Not the least of the many praiseworthy features of this edition of the Institute's proceedings is the exhaustive bibliography which accompanies every article and which, in itself, is ample evidence of the authoritative scholarship which has been invested in the publication.

ERIC FORD

Farming by Remote Control?

Ford Motor Co. Ltd. recently demonstrated at its Mechanised Farming Centre at Boreham, Essex, England, a radio-controlled Fordson Major diesel. It is believed to be the first radio-controlled tractor to be shown in Britain.

The small control box transmits six different commands to the tractor, governing its turning left and right, clutch operation, the raising and lowering of the implement and the fuel cut-off mechanism.

This tractor modification is not going into production, but perhaps something along these lines will in the future be used in the transport of dangerous fissionable material at atomic plants. In addition, this departure may well foreshadow ' the shape of things to come ' in the farming industry.

An official of Dagenham's Tractor Division said: This radio-controlled Major will be a focal point in our field demonstrations during the next 12 months. It will not only be of interest to agriculturists because of its very novelty, but it will also allow the guests to participate in the event by way of trials of skill.

View showing control box, transmitter and tractor. The operator is demonstrating the measure of control he has over the tractor by manoeuvring it between bales of straw

WORLD CROP REPORTS

CEYLON

Tea.—Production of tea in Ceylon during August 1955 amounted to 32 million lb., which was far above the level in August 1954.

Rubber.—The Rubber Rehabilitation Board is reported to have sanctioned the replanting of 32,000 acres of rubber land in 1956. This figure includes 10,000 acres, an unusually high proportion, of smallholdings.

VENEZUELA

Coffee.—It is estimated that the severe drought during the second quarter of 1955 and heavy rains during the third quarter will reduce the 1955 crop by one-half with consequent reduction in exports and losses to growers.

Rice.—The same weather factors also adversely affected the rice crop, though not to such an extent. The yield, plus existing stocks, has proved ample for requirements.

Cotton.—It is now estimated that this year's crop will be 50% smaller than last year's. The reason for this decrease is said to lie with the domestic textile industry, which, because of over-production difficulties, has been unwilling to fulfil its undertaking to purchase all the Venezuelan cotton output except at prices unremunerative to the growers.

Sugar.—In order to prevent over-production and uneconomically low prices the Venezuelan sugar mills, both privately owned and those belonging to the Development Corporation, are planning to establish a combine in order to restrict the 1955–56 crop to 160,000 tons and to establish quotas for each mill. It is also intended that the combine should handle sales and distribution throughout the country, and finance growers.

ARGENTINA

Milder weather and the advent of spring rains benefited agriculture generally. Wheat is doing very well in the south, but not so well elsewhere, and this year's wheat harvest may fall short of last year's by a million tons. Early reports from the main maize zone indicate a decided decrease in sowings compared with last year. More sunflowerseed is being sown.

The price of sunflowerseed of the 1955–56 crop has been raised from 80 to 90 pesos per 100 kg. to growers delivering a quantity at least 25% in excess of their sales during the current season and to farmers who have not previously grown sunflowerseed who produce at least 15 tons. The price of maize has been increased from 45 to 50 pesos per 100 kg., if delivered before 31 August, 1956. The gross income per hectare from these two crops must now be considerably higher than from wheat, but the latter is generally favoured by farmers as being less speculative and troublesome.

CUBA

Sugar.—By the middle of September 3.2 million Spanish long tons of raw sugar had been sold, but whereas sales to the U.S.A. had decreased by 10% from last year, sales to other world markets had increased by 26%, owing largely to the unprecedented sales to the U.S.S.R., which accounted for about half a million tons. Approximate figures for other purchases were: Japan 140,000 tons, Netherlands 130,000, U.K. 68,000 (compared with 221,000 in the first eight months of last year) and India 150,000 (which was less than in 1954).

Molasses.—Final production of molasses from surplus sugar was 231,483,000 gal.

Coffee.—A hurricane in Oriente province destroyed 3% of the coffee crop in September, but in spite of this the crop is expected to be 20% above last year's.

BRAZIL

Coffee.—September was a most successful month for coffee exports, some 1,961,000 bags being shipped from Brazilian ports. These shipments constitute a 10-year record. Exports during August had moved at a reasonably good rate, some 1,065,000 bags being shipped. Total shipments this year are now just over 9 million bags, compared with 7.3 million bags during the first nine months of 1954.

Cocoa.—It is reported from Bahia that the cocoa 'temporao' (mid-crop) will reach 1.2 to 1.5 million bags. Forecasts regarding the main crop are so far not very favourable, unofficial estimates putting it at between 1,600,000 to 2 million bags.

Carnauba wax.—It was reported from Parnaiba, in the State of Piaui, that the José Morais Correa Company had been successful in transforming inferior types of carnauba wax into first quality wax through a chemical process. The company is also doing research on the means of extracting wax directly from the carnauba fronds.

Spec. Reg. Inform. Serv.

RHODESIA

Rhodesia hopes to produce about 140 million lb. of flue-cured tobacco—which should be enough to supply the requirements of all its customers—during the 1955–56 tobacco season, a spokesman of the Rhodesia Tobacco Association said in Salisbury recently. A crop of 140 million lb. would be nearly 12 million lb. more than the crop for the past season, which included an all-time record Southern Rhodesia flue-cured crop of more than 120,500,000 lb. The spokesman said it was hoped the coming season's 140-million-lb. crop would be grown on about the same acreage as last season's smaller crop. The authorities wanted to see more good quality tobacco and a higher yield per acre.

INTERNATIONAL

Cocoa

The latest estimate of world cocoa-bean production made by the United States Department of Agriculture in September 1955 was 1,783,660,000 lb. (796,000 long tons).

Since that time no indications have been received from any cocoa-producing areas that any significant change in production is anticipated.

With reference to Brazil, conflicting reports on the cocoa crop have emanated from trade sources.

Official information indicates that Brazil's mid-crop will be about 1,530,000 bags (132.276 lb. each) and the main crop is estimated at 1,098,000 bags. The total crop will be 2,628,000 bags or roughly 348,000,000 lb. This figure does not justify any change in the last estimate made by the Department of Agriculture, which was

348,300,000 lb. for Brazil. The overall forecast is shown in Table 1.

TABLE 1
WORLD COCOA BEAN PRODUCTION

Period	Quantity (1,000 lb.)
Average 1935–36/1939–40	1,580,720
Average 1953–54 ..	1,602,591
Preliminary 1954–55	1,745,495
Preliminary forecast 1955–56	1,783,660

More final and accurate information will be received from our U.S. foreign reporting officers soon. It will then be possible to give a firmer estimate of available supplies from major producing areas, *i.e.* West Africa and Brazil.

U.S. Dep. Com.

Bananas

Banana exports from Panama during August 1955 increased to 644,000 stems, as compared with 376,000 stems exported in August 1954. In Honduras the banana plantations are recovering more rapidly from flood damage than had been anticipated. Honduran exports were expected to reach 8.2 million stems this year, as compared with the 9.2 million stems exported in 1954. Brazil is exporting a record number of bananas. The 1939 record of 11.9 million stems exported was expected to be topped in 1955 by shipment of 13.5 million stems. Argentina is receiving 84% of the Brazilian bananas, the U.K. 10% and Uruguay 6%. The Carribean and Latin American countries compete with Brazil on the U.K. market.

Grapefruit

Total production of Marsh and Duncan grapefruit in Jamaica this coming season is forecast at 280,000 boxes. It is expected that about 50,000 boxes of fresh fruit will be shipped to England and 15,000 to New Zealand. The remainder will be processed into juice or sections, mostly for British markets.

Trinidad citrus production is expected to be nearly one-third less than last season.

British Honduras suffered only minor losses of citrus from the recent hurricane 'Janet', which hit the northern district of Corozal, but only grazed the Stann Creek area.

Rice

Rice yields being harvested in the European countries this season are above average. Though the total acreage was reduced from that of 1954, Europe is expected to produce the largest rice crop ever harvested.

Italy's rice acreage declined 5%. Weather has been favourable and production is expected to be at least as large as that of last year. *Spain* planted a postwar record acreage and the highest yields per acre since World War II are being harvested.

Portugal and *France* planted record acreages in rice and favourable growing conditions have resulted in the production of record and near-record crops. Rice acreage and production in *Greece* are down 17% from 1954. Yields per acre in that country are only slightly lower than the record yields of last year.

For. Crops & Markets

ENGLAND AND WALES

Agricultural report. Agricultural conditions in England and Wales on 1 November, 1955, have been summarised by the Ministry of Agriculture, Fisheries and Food.

The hard state of the ground delayed ploughing in several areas, but, on the whole, satisfactory progress was made with autumn cultivations and sowing during the month. Conditions were favourable for lifting root crops and good progress was made. Potatoes are of good quality, but smaller than usual, and the yield per acre is expected to be below average. Sugar-beet and other root crops are also expected to be below average. Livestock have done well.

The weather during the first half of October was mostly dry and sunny. Colder conditions with ground frosts followed and, apart from a few days of milder weather, lasted until the end of the month. Rainfall was very variable; over much of the country it was below normal, but over East Anglia and south-eastern districts it was above average. Sunshine was above average in all areas.

Autumn cultivations and sowing

In several areas ploughing was delayed until later in the month owing to the hard state of the ground. Apart from some heavier soils, the land worked fairly well after rain and, on the whole, satisfactory progress was made with cultivations. Seed beds were rather rough in some districts owing to the dry soil, but generally they were satisfactory and good progress was made with the sowing of corn.

Potatoes

Conditions were favourable for potato lifting and good progress was made during the month. Tubers are smaller than usual, but quality is generally good, although scab is more prevalent than usual. The yield of second early and main-crop varieties is expected to be 7.4 tons per acre, as compared with a five-year average of 8.6 tons and a yield of 8.4 tons in 1954.

Sugar-beet

Satisfactory progress was made with the harvesting of sugar-beet. Virus yellows are reported from some districts. Roots are generally of good quality and satisfactory sugar content. The yield of roots is expected to be below average.

Roots

Turnips and swedes have improved during the month, but generally roots are small; mildew is prevalent in some areas, and several districts report aphis attacks. The combined yield of turnips and swedes is forecast at 12.4 tons per acre, as compared with a five-year average of 15.6 tons and a yield of 16 tons in 1954.

Fodder beet are generally healthy, but roots are smaller than usual. The yield per acre is expected to be lower than last year's.

Pastures

Owing to dry conditions, fewer leys were sown during late summer and autumn this year, and in many areas they have been slow to make growth, but some good takes are reported. Leys sown last spring (including 'seeds') are variable; in several areas the dry conditions have retarded growth and, although many have improved with rain, a number of failures are reported. Other leys improved during the month, but generally growth has been slow. Rain brought improvement to permanent pastures in some districts, but in most areas growth has been slow.